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Philips Fidelio M1 Headphones



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Philips In-Ear Headphones

SHE3905



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Fulvus

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- Tracking speed 28 inches/sec

PMG9003

Illuminated
Gaming Mouse

TRUE GAMER · TRUE STYLE

Compatible with:



System Requirements:

Windows XP/Vista/7/8

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ARE YOU READY FOR A SMART WORLD?

Mobile trends continue to be the hottest topic going into the new year and wearables are at the forefront of this. The slew of smartwatches and activity trackers that have already entered the market is just going to gain more momentum in the coming months. Those of us still on the fence are looking towards to the imminent launch of the Apple Watch as some sort of sign from the heavens, a catalyst to jump start industry-wide adoption. If the recent CES 2015 was anything to go by, even device and accessories manufacturers have jumped on board. Google's own Android Wear platform, still considered in its infancy, is already into a second major release.

On the other hand (pun intended), activity and sports trackers are looking to take on a bigger stage, as the wrist is fast becoming a crowded market. As wireless,

battery and sensor technologies continue to advance, expect activity trackers to come in all new form factors from clips to patches to full fabric-like body suits. You'll also begin to see tracking sensors embedded in everyday objects from your flowerpot to your pet. Pretty soon, even cars will have more power crunching numbers than burning rubber.

The internet of things have, in as short as the past nine months, exploded from a buzzword to reality. It can sometimes be scary to find out that a 'smart everything' world isn't just a pipe dream in a far-flung future, but one that we're already living in.

Welcome to 2015.

Zachary Chan
EDITOR

Enjoy Stereo to Surround Sound in Seconds

with detachable wireless speakers



Award Winning Surround on Demand Series just got even better with the new Fidelio B5 Soundbar Speaker with Stand-alone portable wireless speakers



Surround on Demand

Submerge your listening senses in superb Dolby Digital 5.1, DTS Digital surround sound whenever you want it. Simply detach the wireless surround speakers from the main speaker unit and place them at the rear of the room to enjoy an immersive movie and gaming experience.

Stand-alone Portable Bluetooth® Speakers

With two rear detachable speakers and a central sound bar unit, a single Fidelio B5 unit can bring music to three different places at the same time.

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Surround on Demand Wireless Surround Speaker with Wireless Subwoofer (CSS7235)



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Surround on Demand Soundbar with Wireless Subwoofer (HTL9100)



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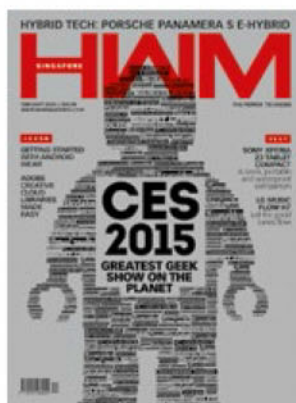
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All prices quoted in this magazine are in Singapore Dollars (SGD), unless otherwise specified.

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NEW THIS MONTH

Every month, we receive dozens of product announcements and mentions, sit through many a launch event and try out all kinds of devices. All these products are then carefully curated by our crack team of tech gurus. The final list is presented here in Gear and it is our hope you'll find something to geek-out to.



MORE INSIDE >

STEELSERIES STRATUS XL

Full-sized controller for mobile gaming.

DEVIALET PHANTOM

Revolutionary French audio engineering.

GOPRO HERO4

For you to YOLO in 4K.

RAZER SEIREN

Another type of gaming input device.

ZEISS VR ONE

The Zeiss VR One Headset uses the company's precision lenses teamed up with your own smartphone display to create an immersive virtual reality experience. It supports any smartphones with a display between 4.7- and 5.2-inches, and offers a see-through front shield for augmented reality apps, as well as ports to allow access to the device's headphone and charging jacks.

STEELSERIES STRATUS XL

Now a full-sized controller that fits comfortably in your hands, the Stratus XL offers everything you'd expect from a console-style controller: D-pad, dual analog sticks, four action buttons, two shoulder buttons and two shoulder triggers. The Stratus XL is powered by AA batteries, connects via Bluetooth and compatible with Apple iPhone, iPad and iPod touch devices.





AUDIO TECHNICA ATH-MSR7

These stylish headphones look good and sound even better, thanks to the use of the latest 45mm "True Motion" hi-res audio drivers that match a precision diaphragm with an extremely lightweight voice coil that brings improved response times with minimal distortion. The result? Smooth, rich and clear sound.



BENQ W1070+

The BenQ W1070+ projector offers big-screen entertainment for those on a budget. Though it uses a DLP projection system, this 1080p beamer has a 6-segment, 6x-speed color wheel to render realistic color depth and range, and Texas Instrument's DarkChip3 for deep blacks. This multi-talented home theater projector also allows wired or wireless streaming of digital content from any MHL-equipped smart device.

GOPRO HERO4

The ultimate action cam is back with its most powerful incarnation ever. The Hero4 Silver is more or less the Hero3+ Black specs-wise with the addition of a touchscreen plus new features such as Night Photo, Night Lapse and HiLight Tag.

The Hero4 Black has a more powerful processor capable of higher bitrate recording at double framerates with 4K at 30fps, 2.7K at 50fps and 1080p at 120fps.



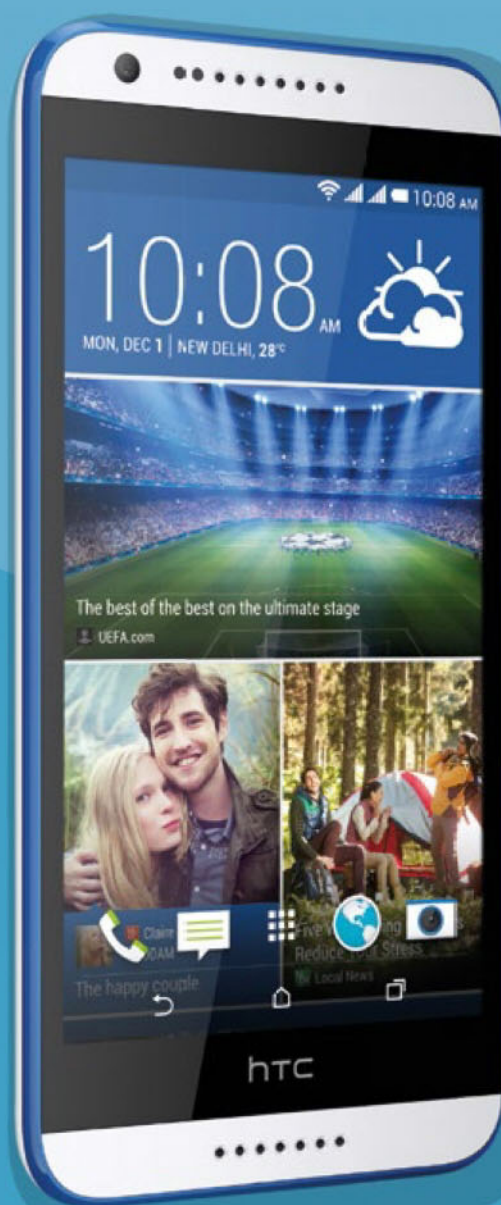


PIONEER TS-WH500A SUBWOOFER

Design to be the thinnest and slimmest subwoofer in the market. The Pioneer TS-WH500A is the world's first patented Horizontal-Vertical (HVT) subwoofer. Built with Scott Russell linkage mechanism, which helps dramatically reduce thickness and unwanted vibration. Drivers can now enjoy a whole new level of bass sounds during your car drives.

HTC DESIRE 620 / 620G

The HTC Desire 620 and 620G are both mainstream dual SIM smartphones with similar design and hardware specs such as a 5-inch HD screen, 8-megapixel rear and 5-megapixel front camera. The difference lies in network support. The 620 supports 4G LTE based on the quad-core Qualcomm Snapdragon 410 chipset. The 620G on the other hand is a 3G device powered by MediaTek's octa-core MT6592. Both phones run on Android 4.4 with HTC Sense 6.





FUJIFILM X100T

Fujifilm's update to the popular X100 series grants it a world's first Advanced Hybrid Viewfinder, complete with electronic rangefinder that displays an enlarged view of the focus area using the in-built Neutral Density filter. Focus Peak Highlight and Digital Split Image can also be selected on the enlarged area. The magnification level can also be adjusted, making manual focusing easier than ever.

DEVIALET PHANTOM

French startup and acoustic engineers Devialet have unveiled the ultra-futuristic Phantom speaker. Using a hybrid digital and analog processing called ADH Intelligence and proprietary Heart Bass Implosion design, it boasts of zero distortion and background noise even at high volumes. The Phantom can work alone or paired with up to 24 units in Club Mode. Each unit outputs 750W (Phantom) or 3,000W (Silver Phantom) of power.





STEELSERIES 9H NA'VI EDITION HEADSET

The new 9H Na'Vi Edition is a collaboration between SteelSeries and professional eSports club Natus Vincere (Na'Vi). Rocking Na'Vi colors and logo, the 9H is built with comfortable double-closed ear cups, advanced components to reduce noise distortion, Dolby 7.1 virtual surround sound and next-gen SteelSeries drivers. Definitely a tournament quality headset.

RAZER SEIREN

Create a professional recording studio in the comfort of your home with the Razer Seiren, a USB digital microphone that features three 14mm custom tuned condenser capsules in an array that allows for 4 different recording patterns - Cardioid for podcasts and voice-overs, Stereo for vocals and instruments, Omnidirectional for conference calls, and Bidirectional for interviews and vocal duets.



THIS CHANGES THE WAY YOU HEAR MUSIC

You think you know your favorite songs? Oh you don't. You really don't.

SONY NW-ZX2 HIGH-RESOLUTION AUDIO WALKMAN

Honestly – who buys a Walkman these days? And who would buy one for well over a thousand dollars? You'd be daft for even considering it.

Well, no. Not really.

That's because most of the music coming out of our smartphones these days is flatter than airport tarmac. You might not notice it because you've gotten used to it, but the difference between normal audio files and High-Resolution Audio is like the difference between standard definition and 4K UHD video: once you see it, you can't go back, once you hear it, you'll be a convert.

That's what the Sony NW-ZX2 High-Resolution Audio Walkman does: It breathes life back to music. High-Resolution Audio files are richer in detail than compressed audio files like MP3 and AAC, and they're even more detailed than CD quality music. You'll be hearing beats, notes and melodies you've never noticed before, as if you were standing there right next to the performance.

It's not just about the files; everything on the NW-ZX2, from software to hardware, has been designed with a laser-focus on aural excellence. Advanced technologies like the S-Master HX digital amp cuts distortion and noise across a wide range of frequencies, ensuring the most true-to-life sound. DSEE HX adds new life to existing libraries, restoring lost details to MP3s and other compressed music files.

The highly rigid body is fully carved from aluminum alloy, eliminating the slightest vibrations for the purest sound quality. A LC (inductor-capacitor) filter for the headphone output has been integrated with a 3mm larger chip coil for low sound distortion and resistance, while MELF type resistors and film capacitors reduce noise. If you didn't understand any of that, just realize how a ridiculous amount of thought has gone into the NW-ZX2 – even the solder has been carefully sourced for 99.99% purity, to achieve a more natural frequency balance.

Now let's face it; the Sony NW-ZX2 isn't for everybody. It's a high-quality product



made with premium materials and a high price tag. The NW-ZX2 is the wagyu of beef, the bespoke of suits, and the gold of elements. But for the discerning listener who wants only the best listening experience on the go, there really aren't a lot of options, short of strapping a home entertainment system to your back. If you want to hear your music the way it was

meant to be heard, the Sony NW-ZX2 is it.

The NW-ZX2 Walkman houses 128GB of built-in memory, and a microSDXC memory card slot lets you increase storage up to 128GB more. Enjoy up to 33 hours of High-Resolution Audio or 60 hours of MP3 playback on a single charge, on a screen using Sony's latest TV display technologies optimized for mobile.



Seven OS-CONs (Organic Conductive Polymer Aluminum Electrolytic Capacitor), an additional electrical double-layer capacitor and a large-capacity Li-ion battery help to deliver clear highs and deep lows with low noise.



A stiff gold-plated copper chassis with a low contact resistance helps to produce powerful bass, while the rigid aluminum body reduces unwanted external vibrations.

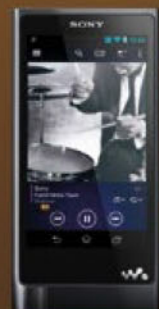


Two dedicated clock oscillations enable precisely synchronized demodulation for pure sound quality.

SONY

WALKMAN® NW-ZX2

DESIGNED FOR TRUE AUDIOPHILES



Experience music like never before with the Walkman® NW-ZX2, a 128GB Hi-Res Audio player capable of reproducing master studio quality recordings just as the artists originally intended. Within its luxurious, solid aluminium body are the S-Master HX™ digital amplifier and DSEE HX™ technologies that upscale compressed music files for clarity across a wide frequency response, satisfying listeners with the most discerning taste.



Music As the Artist Intended

DSEE HX
MUSIC MADE RICHER

S-MASTER HX
MORE REALISM THAN EVER

ClearAudio+
HEAR EVERY DETAIL
IN EVERY TRACK

N One-touch
listening

Bluetooth

LDAC

ONE FOR THE GOLDEN EARS

Audiophiles, listen up. The iFi micro iSDS is a digital-to-analog converter (DAC) that supports octa-DSD512, PCM at 24-bit/768kHz, and double DXD natively. Furthermore, it's also a headphone amplifier, with an 8V/4,000mW output powerful enough to drive many difficult headphones. Built like a tank but still relatively light, the micro iSDS even has an onboard 4,800mAh battery, so you can use it on the go, or to charge up your mobile device. **iFi Micro iSDS**



SHARING IS CARING

The Canvio Aerocast is a wireless portable external hard disk drive that offers 1TB storage and creates its own network so your devices can connect to and access data directly. It can stream content to a maximum of six devices simultaneously with a battery that lasts up to 5 hours. It also has an SD card reader for quick photo backups. **Toshiba Canvio Aerocast**



\$1000 4K TV

If you're looking to get a 4K TV but aren't willing to pay top dollar for frills that you don't use, then check out the LG 40UB800T. A 40-inch, 4K TV that costs \$1,099, it comes with three HDMI and three USB ports, a 20W, 2-channel speaker system, DVB-T2 support, and a built-in 4K HEVC 30p decoder. LG's nifty Magic Remote is also part of the package, but at this low price, you've to do without the fancy WebOS interface. **LG 40UB800T**



SUMMER STUNNER

The BeoPlay H6 now comes in three stunning special edition colorways - Graphite Blush, Bronzed Hazel, and Blue Stone. Subtle, graceful and undoubtedly aimed at today's urban dwellers, the special edition H6 adds a touch of fashion to a set of headphones already known for their gorgeous sound.

Bang & Olufsen BeoPlay H6 special edition



ONCE YOU GO BLACK...

Apparently, you come back for seconds. Tt eSPORTS has just updated their mainstream Black gaming mouse with a newer 5,700 DPI Avago laser sensor (up from 4,000 DPI of the original), an extra thumb button for a total of 7 programmable buttons plus a newer "softer" soft touch matte coating throughout the surface and improved grips. **Tt eSPORTS Black V2**



FROM IPHONE TO BLACKBERRY

The Typo2 is a case for your iPhone 6 with a built-in BlackBerry style QWERTY keyboard. The second version of the Typo has a new key layout that more closely matches the layout of a desktop computer keyboard, as well as the iOS virtual keyboard. The shape of the keys has also been re-designed, and the four most commonly used keys: alt, backspace, enter and the apple "home" key have been increased in size. **Typo 2 Keyboard for iPhone 6**



TRANSPARENT IS ALWAYS AWESOME

People Products' Transparent Speaker deserves your consideration going by its looks alone. While most speakers are stealthy black boxes meant to be hidden, the Transparent Speaker is a speaker that should be featured prominently. It has the usual audio jacks, as well as an USB port for smart devices or Bluetooth dongles. **Transparent Speaker**



STAINLESS STEEL SMARTS

Claimed as the world's first all stainless steel smartwatch, the Burg 27 is actually a fully functional phone on your wrist running on a MediaTek chipset and Android 4.4. Should you choose to, you can still connect it to your existing Android or iOS smartphone via Bluetooth. It is voice activated, has 8GB onboard memory, 2MP camera and a 208 x 240 pixel display. **Burg 27**

CLEARER DIALOG

Offering improved audio performance over its predecessor, The Bose Solo 15 is a pedestal speaker suitable for larger size televisions. The Solo 15 delivers a powerful audio experience that defies its size and elegant design. With just one connection point, it features a bass control knob on the enclosure and comes with a programmable universal remote. **Bose Solo 15 TV Sound System**

THE FASTEST KEYBOARD EVER

The SteelSeries Apex M800 sounds like a gamer's dream on paper. Instead of Cherry MX or Topre switches, the Apex has custom switches (called the QS1 linear switch) that offer unparalleled response times; 256 key rollover and full anti-ghosting. That's just to name a few of its features! If you're a keyboard enthusiast, you need to get your hands on this. **Apex M800 Mechanical Keyboard**



SEE WHAT I SEE

The SteelSeries Sentry is a one of a kind eye tracking sensor designed to provide further immersion of video game streaming. Instead of waiting on a commenter to tell you what's happening, the Sentry tracks eye movement in real time, and overlays this information over the stream so viewers can focus on what the streamer is looking at. **SteelSeries Sentry**

MINI, MIGHTY MOTHERBOARD

Whoever said gaming PCs have to be huge and bulky? With the Z97I GAMING ACK, you get full performance from its Intel Z97 chipset. It features Killer DoubleShot Pro networking that allows smart teaming of both LAN and Wi-Fi for greater bandwidth, M.2 support and a PCB design that allows large coolers and even watercooling kits to be installed on its mini-ITX form factor. **MSI Z97I GAMING ACK**

AUTONOMOUS SWARMING NANO DRONE

Debuting at CES 2015, the ZANO from Torquing is a Kickstarter project for a palm-sized nano drone that is said to be able to fly perfectly fine on its own right out of the box. It does this through the Lantronix xPico Wi-Fi module, establishing a secured connection with your smartphone as a wireless tether. It's even smart enough to return to you if it detects it is running low on batteries. **ZANO**



MAXIMUM WIRELESS BOOST

Sure, its AC750 (300Mbps for 2.4GHz band and 433Mbps for 5GHz band) speed rating doesn't seem like much when compared to today's AC2400 routers, but what the Tap-R2 has going for it is its massive signal strength. It boasts an 800mW Wi-fi output power and up to 3X the range of standard routers. It also has direct touchscreen setup. Nifty!

Amped Wireless Tap-R2



TODDLER SUPERCAR

The Broon F8 series is a fully-functional electric supercar for your kid. It has dual 12V/24V motors, 5-speed control, individual-wheel coil spring suspension and gas shock absorbers, electronic multi-link steering and brakes, RWD (F810/F830) or 4WD (F850/F870), active driving and terrain sensors, plus bucket seat with 4-point harness. Get this, it's also wirelessly controllable via Bluetooth controller. **Broon F8**

STORM THROUGH

It's light, slim, and extremely comfortable to wear. But the biggest innovation is probably how small they've managed to make the battery. Thanks to Jabra's microPower technology, that tiny cylindrical battery cell holds enough for up to 10 hours of talk time and 10 days of standby time. Add Jabra's excellent DSP and Wind Noise Blackout technology, and you've got a perfect hands-free solution. **Jabra Storm**



ADDING SMARTS TO YOUR WATCH

Instead of producing a smartwatch, the e-Strap replaces the band for standard Montblanc 22/23mm Timewalker mechanical watches. It features a 128 x 36 pixel OLED touch display for smart notifications and offers activity tracking functions with a companion app compatible with Android 4.3 and iOS 7 and above. Its battery is slated to last for 5 days. **Montblanc e-Strap**



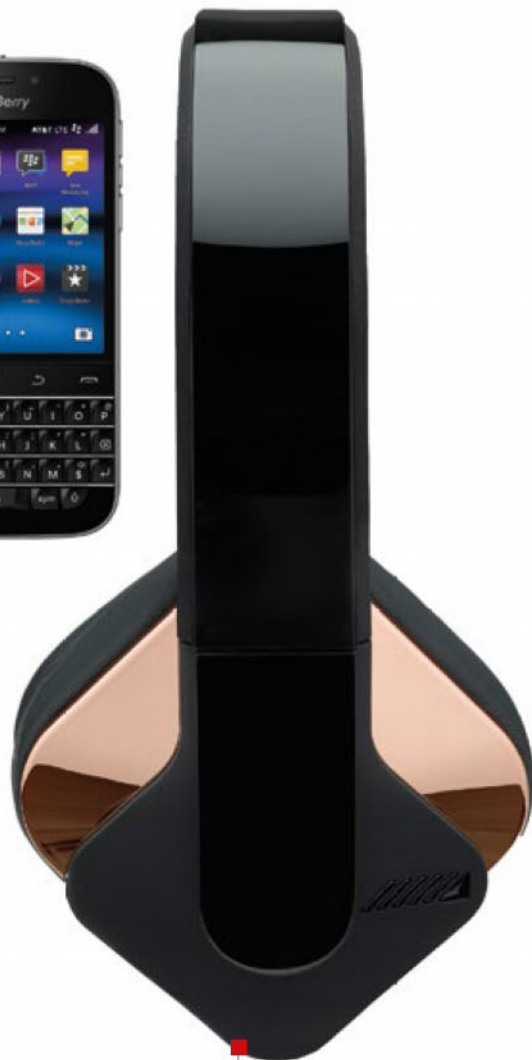
OLD SCHOOL

The BlackBerry Classic is a return to older BlackBerry models and sports a full QWERTY physical keyboard as well as physical navigation keys. The Classic has a square, 720 x 720 pixel, 3.5-inch touchscreen perched above the keyboard and navigation keys and is powered by a 2012 dual-core Qualcomm MSM8960 Snapdragon processor with 2GB RAM. The phone also has an 8-megapixel rear camera and a 2-megapixel front facing camera. **BlackBerry Classic**



FASTER OFFICE PRINTING

The new LBP6780x extends Canon's range of high-speed, high-capacity, network capable A4 black and white laser printers with optional expandable paper capacity of up to 1,600 sheets. It boasts of an 8.6 seconds first printout with up to 40-pages per minute print speed. And with a high-yield toner cartridge, print up to 12,500 pages to meet any print volume demand. **Canon ImageCLASS LBP6780x**



CAR AUDIO ON YOUR HEAD?

These diamond-shaped angular beauties feature dual 40mm drivers, built-in powered amplifier and signal processors for enhanced audio, plus a headband that vibrates with the bass line. Alpine calls this Tuned Kinetic Resonance 3 and supposedly transmits acoustic low frequency through the headband structure to improve the bass experience without damaging your ears. **Alpine Headphones**

HTC'S MOST AFFORDABLE LTE PHONE TO DATE

The Desire 510 is HTC's first phone to be powered by a 64-bit processor – the Qualcomm Snapdragon 410 quad-core 1.2GHz. It comes with 1GB RAM, Android 4.4 KitKat and HTC Sense. The Desire 510 sports a 4.7-inch (854 x 480 pixels) display, 8GB internal storage, a microSD memory card slot that supports memory cards up to 128GB, a 5-megapixel rear camera, a VGA front-facing camera and a 2,100mAh battery.

HTC Desire 510



SMARTPHONE SMARTLOCK

The Kevo is a Bluetooth-enabled smart lock that turns your smartphone in a total security solution. Paired with the app, you can manage, send and revoke eKeys for multiple locks; get notifications of lock activity and track usage history. It also features patent-pending positional intelligence that can detect which side of the door you're at before granting access.

Kwikset Kevo



SOUND WITH EASE

Delivering sharper and higher quality audio, the all new Bose CineMate 15 home theatre speaker brings you the simplest home theatre solution combining a compact soundbar with an Acoustimass module. Housed behind a sleek metal grille, it connects to the TV with just one cable and features four proprietary drivers. It is also easily programmable with a universal remote control. **Bose CineMate 15**



RUGGED AND STYLISH STORAGE

If you've seen one portable HDD, you've seen them all, which is why Adata's latest HV100 is designed for functionality. Its case features a sandblasted finish for greater smudge resistance and the drive itself protected by Adata's G Shock Sensor. A series of intelligent LED notification lights will let you know if it's connected, transferring data, working normally or experiencing shock. **ADATA HV100**

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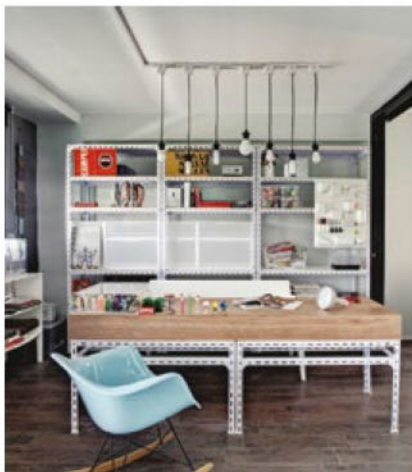
AN INTERACTIVE, STYLE-DRIVEN INTERIOR DESIGN WEBSITE FOR HOMEOWNERS AND DECOR ENTHUSIASTS.

Check out our top three blog posts of the month



8 HOMES SO SPACIOUS YOU'LL NEVER REALISE THEY'RE HDB FLATS

Break away from rigid HDB flat layouts by strategically hacking away all the walls that get in the way of your idea of a dream home! These eight HDB homes did just that to create a much more open feel:
www.tinyurl.com/8spaciousHDBflats



5 AWESOME DESIGN IDEAS IN THIS 3-ROOM HDB FLAT

From using store-bought shelves as industrial shelving to picking an unusual shade of green for a feature wall, this apartment managed to pack many unique features into its limited floor space: www.tinyurl.com/awesome3roomHDBflat

TOO MANY THINGS, TOO LITTLE SPACE? HERE ARE 8 STORAGE IDEAS YOU NEED

When it comes to small-space living, you can never have enough storage space. But the trick is making it look good as well. Get inspiration from these clever storage designs: www.tinyurl.com/smallhomestorage



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THINK

CES 2015

■ The annual Consumer Electronics Show in Las Vegas sets the pace for tech trends throughout the rest of the year. We had front seats to what is arguably the biggest geek convention on the planet and these are our top 5 trends to look out for in 2015.

Text by *Team HWM*

MORE INSIDE > DYSON ON DYSON

Overpriced suckers or technological breakthrough? James Dyson shares his thoughts on how hardware innovation makes more impact on our everyday lives than you may think.

MAINSTREAM CLOUD

You may or may now know it, but chances are you're already benefitting from cloud technologies. Andrew Wildblood of Telstra tells us that 'The Cloud' is no longer just a buzzword.

HERALDING CARS OF THE FUTURE

For 2015, the latest buzzwords in the automotive world is ADAS (Advanced Driver Assistance Systems) and the return of hydrogen.

by Kenny Yeo

"TO HELP HYDROGEN CARS TAKE OFF, TOYOTA IS ALSO ALLOWING ITS COMPETITORS ACCESS TO ITS INTELLECTUAL PROPERTY OF AROUND 5,600 RELATED PATENTS."

Cars powered by hydrogen are not new. In 2002, Honda's FCX became the first hydrogen fuel-cell car in the world to be certified by the U.S. EPA (Environmental Protection Agency) for commercial use. Hydrogen powered cars use hydrogen combined with oxygen to produce electricity to power an electric motor that in turns provides motive force to the car. Impressively, the only byproduct of this chemical reaction is water. And these cars could be refueled like regular cars simply by visiting a hydrogen pump station. However, despite the many benefits of hydrogen cars, they never quite took off for various reasons. Harvesting hydrogen proves to be an expensive and tricky process and developing hydrogen powered cars is no simple feat either.

But despite the challenges, Toyota has announced the Mirai, its own hydrogen powered car, and plans to sell 700 of it globally this year. The Mirai is a 4-door sedan and refueling it takes about five minutes - comparable to traditional gasoline-powered vehicles. When fueled, it has a range of about 480 km. To help hydrogen cars take off, Toyota is also allowing its competitors access to its intellectual property of around 5,600 related patents. Currently, Honda, General Motors, and Nissan are said to be examining hydrogen fuel-cells to power their cars of the future.

Hydrogen cars aside, one thing that we are going to see more of from cars of the future is ADAS (Advanced Driver Assistance Systems). Broadly put, ADAS refers to technologies that will make driving both easier and safer. Hyundai painted a future where its cars could park itself, navigate itself through narrow streets, detect pedestrians and even analyze traffic intersections and brake automatically if it deems it is unsafe to proceed. However, doing so requires lots of computing power, so NVIDIA wasted no time in announcing its new DrivePX supercomputer for the car. Powered by the company's new Tegra X1 processor, the DrivePX aims to be the brain for the car's systems, allowing them to drive themselves autonomously. Already, Audi has expressed its commitment to using NVIDIA's DrivePX platform in its cars.

That is the future. For now, automakers are looking at ways to make it easier for drivers to interact with their cars and to make cars smarter. Ford's Sync 3 in-car infotainment system can receive system updates such as the latest maps via Wi-Fi. Volkswagen also showed off its

new gesture control system, with the ultimate goal being the elimination of all physical switches. These are exciting times for the auto industry as it seeks to enter a new age.

Though many of these concepts are still in their infancy, we fully expect things to progress exponentially in the next few years as more companies throw their weight behind these new technologies and platforms.



MOBILE OPERATING SYSTEMS GRADUATE TO THE BIG SCREEN


Here's wishing Firefox OS, Tizen, and WebOS every success in their TV futures.

by Ng Chong Seng

■ The two things TV manufacturers traditionally competed on - picture quality and design - were largely driven by the hardware engineering department. Sure, software engineering still happened, but its work was rarely thrust to the fore by the marketing department. After all, "hard" features like new pixel matrices, curved screens, and voice controls all make for better tent-pole features in the brochures than say, a pretty onscreen menu or fast input switching.

But as TVs became more powerful and home entertainment more complex, TV makers also began the race to tick as many checkboxes as possible in the features list. Wireless streaming, web browsing, screen mirroring, voice interaction, social media support - you name it. The results, more often than not, were convoluted, clunky, and downright ugly user interfaces. TV makers will not admit it, but their smart TV creations have brutally exposed their ineptness in UI and UX designs.

After years of quick fixes that eventually led nowhere, TV manufacturers are now turning to mobile operating systems en masse. LG led the charge with WebOS in 2014, and at this year's CES, the company wheeled out its latest WebOS 2.0-powered TVs. Not to be outdone, cross-town rival Samsung announced that Tizen OS will be the foundation of its smart TV platform moving forward. Across the Sea of Japan, Panasonic has embraced Mozilla's Firefox OS; and Sharp and Sony have jumped onboard Google's Android TV system. Yes, TV makers may still screw it all up in the name of differentiation, but I've high hopes that because of the mobile roots of these OSes, the smart TV experience (from boot times and menu navigation, to multi-tasking and device interoperability) will take a huge step forward from now on.



"AFTER YEARS OF QUICK FIXES THAT EVENTUALLY LED NOWHERE, TV MANUFACTURERS ARE NOW TURNING TO MOBILE OPERATING SYSTEMS EN MASSE."

WEARABLES: FROM SMART SHIRTS TO PET TRACKERS

The year where one can probably find a smart tracker in everything.

by James Lu


■ When it comes to wearables, for now, the hottest piece of real estate is undoubtedly your wrist, but after CES 2015, that might start to change. Among the Innovation Award winners at this year's CES was a shirt that uses fiber optic cabling to track and model your body's movement, a heart-rate-monitoring strip that sticks to a user's torso, and a helmet that can measure and soothe your stress levels. Some exhibitors even debuted wearables for pets.

Smart shirts that can track your activity are nothing new, but shirts made out of a revolutionary new material called Xelflex could completely change smart clothing. The material makes use of fiber optic cabling and advanced data algorithms to track your body's movement in incredible detail. It works through backscatter data created whenever fiber optic cabling is bent or twisted. This data can then be used to create a real-time, perfect 3D model of what the users arm is doing. The possibilities for fitness or sports coaching are endless, but we might also see Xelflex paired with gear like Oculus Rift to further enhance the VR experience.

One area showing great interest in new wearables is healthcare. Rather than hooking patients up to bulky machines to monitor their vitals, a device such as the AmpStrip, an adhesive patch with a built-in electrocardiogram sensor could be stuck to your chest like a band-aid, and used to monitor your heart-rate and activity, syncing that data in real time directly with the hospital's computers. CES also saw the debut of the Melomind helmet, which uses electrodes to measure levels of stress via brain activity and then plays appropriately soothing musical tones to put wearers in a more relaxed state. Chronic pain sufferers may also be interested in the Quell band, which uses electrodes to stimulate nerves for pain relief.

Pets are now a target market for wearables too, with the introduction of products like WonderWoof, a Wi-Fi enabled bow-tie with a built-in accelerometer that you can attach to your pet's collar. The device will track where your pet is, and give feedback about his activity. The app also supports a scheduler which provides users with a 'doggy diary' for daily activities.

Wonderwoof's creator, Betsy Fore, created the device after realizing that her dog was fat, and then realizing that she had no idea why her pet was packing on the pounds.



"SMART SHIRTS THAT CAN TRACK YOUR ACTIVITY ARE NOTHING NEW, BUT SHIRTS MADE OUT OF A REVOLUTIONARY NEW MATERIAL CALLED XELFLEX COULD COMPLETELY CHANGE SMART CLOTHING."

AUDIO CUTS THE CORD

If 2014 was the introduction of High Resolution Audio to the mainstream, 2015 will be the year of quality wireless audio.

by *Marcus Wong*

■ The buzz for audio products at CES 2015 remains very much on High Resolution Audio (HRA) coupled with wireless technologies, with new wireless models from AKG, Sennheiser, Sony, and Onkyo all on show. While wireless headphones are not new, they seem to be more predominant this year, perhaps indicating that there is indeed value to less clutter.

That's especially evident when you look at the multi-room audio streamer segment. Once the sole domain of Sonos, many mainstream makers have since released their own offerings, making it easier than ever to have a speaker in every room, all controlled from a single device. Play a different song on each, or have all the speakers play the same song together; the introduction of technologies like Google Cast will make it easier for these songs to come from the cloud or just any smart device.

Expect to see more streaming services offering HRA streaming in the coming years, which means we will also need wireless technologies that better support the bandwidth that HRA demands. Sony may have a head start there with their new LDAC Bluetooth codec. Supposedly three times more efficient than the previous Bluetooth technology, this allows it to better support the bandwidth needed for high-resolution audio files, and it'll be interesting to see if this becomes a standard, or if the other makers launch their own bandwidth efficient codecs.

HRA has also left room for a revival of portable media players, as unlike mobile phones which get bogged down by games and photos, these players basically offer dedicated storage just for audio, as well as higher quality DACs (Digital Analog Converters) that better cater to audiophiles. Large onboard memory and a memory card slot for easy expansion, as well as Wi-Fi/network support to access various streaming services should be the norm in this year's devices.

Finally, integrated sound processing technologies are also being incorporated into the headphones itself, like Parrot's Zik Sport earphones (which feature 32-bit sound processing) and the impressive Neoh headphones by 3D Sound Labs, which use motion sensors and the way we perceive sound to recreate the effect of three-dimensional sound in your head.



"EXPECT TO SEE MORE STREAMING SERVICES OFFERING HRA STREAMING IN THE COMING YEARS, WHICH MEANS WE WILL ALSO NEED WIRELESS TECHNOLOGIES THAT BETTER SUPPORT THE BANDWIDTH THAT HRA DEMANDS."

VIRTUALLY DREAMING

Turning fantasy to reality.

by Salehuddin Husin

■ CES isn't exactly the best indication of where gaming trends are headed. For that, we'd have to wait for E3 later in the year. However, we can see in terms of technical direction that gaming companies are actively looking for the next big thing that'll up the level of engagement in gaming. And the big buzzword seems to be Virtual Reality (VR).

VR isn't exactly a new trend. High profile projects like the Oculus Rift have continuously been in the limelight for the past two years with no real consumer progress to date. Often compared to the failed push by TV makers to make 3D entertainment mainstream, VR feels like a similar gimmick that has great potential on the outset, but a very limited or restrictive application in real life.

And yet, major investments in VR continue to happen. Is there really something in it that we haven't seen? The biggest news so far isn't any newfangled headset, but rather Razer's initiative to push for a proper and open sourced VR platform.

Instead of a fragmented VR solution that puts even more restrictions to an already closed environment, an open source base will allow everyone access to the same set of tools hopefully with the goal of realizing its potential reach quicker.

The fact that Razer is pushing for an open source platform and has support from industry giants like Unity Technologies (the creators of the Unity engine) and startups like Sixsense (which is developing an innovative VR interaction system that promises very little lag and 1:1 movement accuracy), may make the technology a real game changer and something worth keeping an eye on. Of course, we're still waiting for the Holodeck to become reality instead of having to wear dorky VR headgear.

Another trend for gaming that's on the verge of becoming mainstream is streaming, both local device and cloud-based. Again, this concept isn't a new one, but it's only with current broadband and network advancements that acceptable levels of interactivity and engagement allow game streaming a chance of success.

Sony's Playstation Now service is launching in the US in a few months, as will NVIDIA's GRID. Pioneers such as OnLive and Gaikai (now under the Sony umbrella) are constantly perfecting their technology, which can easily be seen in how Remote Play has evolved from the near unplayable mess it was in early PSP games to the relatively smooth version running on current Xperias now.

It'll be interesting to see which of the two trends will survive as the industry is notoriously fickle in its technology adoption.

"THE FACT THAT RAZER IS PUSHING FOR AN OPEN SOURCE PLATFORM AND HAS SUPPORT FROM INDUSTRY GIANTS LIKE UNITY TECHNOLOGIES AND STARTUPS LIKE SIXSENSE MAKE IT A REAL GAME CHANGER."



TEIXOBACTIN: OUR NEWEST ALLY AGAINST DISEASES?

by Salehuddin Husin

As diseases are evolving constantly, antibiotics that work on newer strains are getting fewer and fewer. One day, our current antibiotics might not even work anymore, which is why a discovery of a new antibiotic like Teixobactin is a big thing. Despite human trials being a few years away, the antibiotic has shown remarkable capabilities in combating drug resistant diseases like MRSA and TB. Initially, researchers feared that the antibiotic might be too effective; possibly killing both healthy and diseased cells indiscriminately. However tests on laboratory animals have shown that the antibiotics are discerning enough on what they attack that those fears were misguided. With tests on-going, it might prove to be versatile enough that it could one day save your life.

Navigating the Cloud of today

ANDREW WILDBLOOD
HEAD OF ASIA PACIFIC ENTERPRISE GES, TELSTRA

by Marcus Wong

How big is the Cloud in APAC, and how does it compare to the rest of the world?

Cloud is no longer a buzzword but simply a way in which we live our lives. APAC, like the rest of the world has embraced the benefits of cloud computing over the past few years and is now very much a hub of cloud innovation. This is enabling our businesses and consumers to operate more simply, securely and productively.

Looking at the Asia Cloud Computing Association (ACCA) Cloud Readiness Index 2014, it reports that APAC is most definitely progressing with an overall improvement in cloud readiness across the region. Now an area of great opportunity for local and international businesses, this is mainly down to increased data speeds as well as the data center connectivity options, which are also growing as the Asia Pacific Gateway Cable is completed.

Where would you say are the major sectors of Cloud development in APAC, and how does Singapore compare to countries like Malaysia, Thailand, the Philippines and Indonesia?

Updates made to Internet and data center management legislation in Indonesia, India and Vietnam, have supported additional growth and development for cloud services in these countries. There are obviously countries which are sitting ahead of the pack when it comes to adoption and 'readiness' such as Singapore and Hong Kong, however, ACCA's 2014 report also calls out the 'dedicated improvers' such as Taiwan, Malaysia, Thailand and the Philippines, which presents an encouraging overall picture for the region.

And compared to the rest of the world? Is there a particular sector/country that's well ahead in terms of Cloud deployment and development?

If we look at the ACCA Index, the top improvers this year in APAC were New Zealand, Australia and Thailand who all moved up four places in the rankings; the Philippines also improved two places to finish in 10th place. Japan retains the honor of being the most cloud-ready country in the region, likely due to its sophisticated business environment coupled with the best data sovereignty regime whilst also ranking in the top band of countries for broadband quality, data privacy and green policy.

We've also seeing the emergence of Software as a Service (SaaS) in Asia driving an appetite for cloud deployment and development. Our own recent investments into organizations such as DocuSign and Box signal our commitment to supporting more businesses which are cloud dependent in their very nature.

How is the Cloud helping consumers, and what are some of the latest developments coming that are going to make an impact in their lives?

There is the general feeling that we're only beginning to scratch the surface of what can be done with cloud computing for users in this region. With more connected devices, remote monitoring, universal access, and greater computing power at lower costs, the region's cloud ecosystem is changing fast.

We are all communicating more than ever, across multiple platforms and the flexibility and scalability of the cloud to adapt to individual and business needs is primed to create

a generation of super users who are demanding access to information, when, where and how they want.

Is it worrying to you that the connected-ness of the Cloud means that every user connected to it has suddenly exposed his devices to a single point of failure/vulnerability?

Absolutely not. Cloud service providers understand the critical importance of securing user data and ensuring the delivery of those services are not compromised. As more and more services head to the cloud, the risk is reduced with partners working closely to not only provide more innovative and intelligent communication and collaboration tools, but finding ways to ensure those services are more protected than ever.

What developments can we expect to see from Telstra in the Cloud computing space? What do you think Cloud computing will progress towards?

In 2014, hybrid cloud has emerged as an answer to the public/private cloud debate. If you were to identify a core benefit of hybrid cloud, it comes down to one point: choice. With the hybrid model, organizations not only have the ability to choose which cloud delivery model suits varying parts of their business, but crucially the freedom to choose multiple cloud partners. This unprecedented level of choice puts the control firmly with the customer.

Cloud providers need to recognize that the way forward in 2015 will be through collaboration, not through competition. The organization that works with multiple vendors to produce a customer-centric solution is the one that will be most successful in the cloud market in 2015 – a direction Telstra is wholly committed to.



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There is the general feeling that we're only beginning to scratch the surface of what can be done with cloud computing for users in this region.

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“ Nothing is clear about the future – but engineers will continue to challenge convention and improve technologies along the way. ”

Dyson on Dyson

JAMES DYSON
FOUNDER & CHIEF
ENGINEER, DYSON

by *Marcus Wong*

Home appliances are getting smarter and smarter. How is this being reflected in new products Dyson is launching, and what sort of “connected home” do you envision for the future?

The digital and tangible worlds are coming closer together. So-called ‘digital’ companies want a foothold in products that you can make and hold – but the hardware needs to be suitably high-performing if the experience is to be a good one in the home.

Our latest vacuum, the Dyson 360 Eye robot, is the first autonomous Dyson machine. It understands its environment so it knows where it has cleaned, and where it is yet to go. The Dyson digital motor enables it to perform vacuuming while an app helps people stay on top of their domestic tasks remotely. It is currently undergoing beta testing in Japan but we hope to see it in Singapore soon.

How much better can our home appliances become? Is it more a case of being more efficient at what they do, or adding further functionality that we haven’t thought about yet?

Nothing is clear about the future – but engineers will continue to challenge convention and improve technologies along the way.

Hardware is where the real gains are to be made: autonomous machines that truly understand and react to their environment; batteries

which last longer; and super materials that can allow us to create lighter, stronger, machines. Leaps in these areas will change the way we interact with our technology, and the way it interacts with us.

What are some of the emerging technology trends you’ve noticed that you think are most likely to have the most impact?

Each year, my Foundation runs the James Dyson Award – an international design award that is run in 18 countries, including Singapore. It is open to design and engineering students as well as recent graduates. The brief is simple: design something that solves a problem. One thing that comes through each year is the desire of the young engineers and scientists to develop sustainable technology – to do more with less.

One winner who particularly caught my eye was a young man who was developing a revolutionary wave energy system. Harnessing the power of the waves on multiple axes he has developed a way to increase energy production. He won S\$60,000 to help commercialize his idea – and I expect he’ll do very well.

Dyson has been a leader in innovation, with prototypes like the Dyson Halo and the engine that filters out environmental toxins under development, yet neither were ever released. What factors decide if a product is ready for commercialization?

Dyson has over 4,000 patent applications, for more than 500 inventions. Some ideas make it into production quickly, while others take a little longer, and sometimes re-surface in a different guise.

After three years of research and development, the Halo project was put on hold so that Dyson engineers could focus on expanding Dyson technology into the USA. Elements of the technology are now being used in future research projects. No ideas are wasted!

The average consumer doesn’t care as much about the technology behind a product as he does the end result. How do you take technological breakthroughs and turn them into user-friendly products?

It is no good developing a machine that just looks nice; if it does not do its job people quickly lose interest. Therefore, I think people do care about the technology inside, they just do not always immediately realize it.

Finally, what can we expect to see from Dyson next?

It’s an engineer’s mind-set to keep solving problems. We have a 25-year time horizon on our future technology and are working with 30 of the world’s best universities to develop new technologies which will be at core of it. I can’t tell you any more than that other than to say that the Dyson digital motor, which is manufactured here in Singapore, will be at the heart of it.

A DAY WITH A HYBRID

No one can say for certain what the destiny of the automobile will be, but one thing is for certain: hybrid and full electric automobiles are here to stay for the foreseeable future. We spend 24 hours with Porsche's Panamera S E-Hybrid to get a taste of hybrid technology and see if they are really the future.

Text by **Kenny Yeo** Photography **Jasper Yu** Art Direction **Ken Koh**

In light of available evidence, it is hard to argue against global warming. One of the direct contributors to this phenomenon is the

increase in greenhouse gases trapped in the atmosphere. According to studies, in 2011 in the United States alone, over 6 billion metric tons of greenhouse gases in the form of carbon dioxide was released into the atmosphere, and that roughly 28% of this was caused by transportation in the form of cars, trucks, ships, planes, etc.

Today, the majority of cars are powered by internal combustion engines that run on gasoline and diesel. Although engines have become increasingly efficient, these engines are innately inefficient. In fact, when an internal combustion engine burns fuel, only about 25% to 30% of the energy released

is used to provide motive force, the rest is used to overcome friction, turbulence, power auxiliary components such as the oil and water pumps and also lost to the atmosphere as heat and noise.

Electric-powered cars can help our current predicament as electric motors

"They offer the best of both worlds - the practicality of a traditional internal combustion engine car and the efficiency of electric cars."

are considerably more efficient in their use of stored energy and can effectively convert around 80% of stored energy (in the form of lithium ion batteries) into motive force. However, they are limited by current

technologies. For example, electric cars still suffer from limited range and the time it takes to charge batteries are still miserably long. Additionally, there is a serious lack of infrastructure to support these types of cars to make them practical enough for mainstream adoption and widespread use.

As a result of the limitations of present electric car technologies, hybrid-powered cars are seen as the perfect solution to the environmental conundrums that we face. Because hybrid-powered cars typically rely on both an internal combustion engine and one or more electric motors for propulsion, they offer the best of both worlds - the practicality of a traditional internal combustion engine car and the efficiency of electric cars.



CARS SPECS

Engine:

Supercharged
3-liter V6

Total power:

16hp - 333hp
(engine) and
95hp (electric
motor)

Total torque:

590nm
combined

Transmission:

8-speed
Tiptronic S

0-100km/h:

5.5 seconds

Top speed:

270km/h

Electric range:

up to 36km

Weight:

2095kg

Price:

\$518,088



TYPES OF HYBRIDS

Broadly speaking, hybrids cars fall under three main categories depending on their capabilities.

Mild Hybrids

Mild hybrids refer to cars with limited hybrid utilization. In the case of automobiles, it means that they cannot run solely on batteries alone - the engine cannot be switched off. Some examples of mild hybrids include the Honda's CR-Z and Insight and Mercedes-Benz's S400 Hybrid.



Full Hybrids

Full hybrids, sometimes known as strong hybrids, are hybrid cars that can run solely off batteries, just off the engine or a combination of both. The main difference between full and mild hybrids is that the former can run purely on electricity, albeit for a limited range. Most hybrids are full hybrids and some examples include the Toyota Prius, Chevrolet Volt and even the new McLaren P1 and Porsche 918 Spyder hypercars.



Plug-in Hybrids

Some full hybrids are also known as plug-in hybrids. As the name suggests, these cars have batteries that can be recharged by plugging into the electric grid either via regular wall sockets or using specialized charging equipment. They can then use this energy that was stored whilst being plugged in to travel for a limited range before activating their internal combustion engine to increase range. An example of a plug-in hybrid is Porsche's Panamera S E-Hybrid.

FUEL SIPPER

How does the Porsche Panamera S E-Hybrid match up against other hybrids and some of the most popular and outrageous cars on our roads? (All figures based on manufacturer's claims.)

Porsche Panamera S E-Hybrid:
3.1L / 100km



Toyota Prius: 3.9L / 100km



Honda CR-Z: 4.9L / 100km



Toyota Altis: 6.5L / 100km



Kia Forte K3: 6.8L / 100km



Honda Odyssey: 7.9L / 100km



Mercedes E200: 6.1L / 100km



Audi A6 2.0 TFSI:
6.5L / 100km



HYBRID DRIVETRAINS

The drivetrain refers to the group of components used to generate and deliver power to the road. And generally speaking, hybrid drivetrains fall into three broad categories - series, parallel and series-parallel - and differ in the way that their electric motors are used to augment the car's drivetrain. Let's find out how by beginning with the series hybrid drivetrains, which is the simplest of the three.

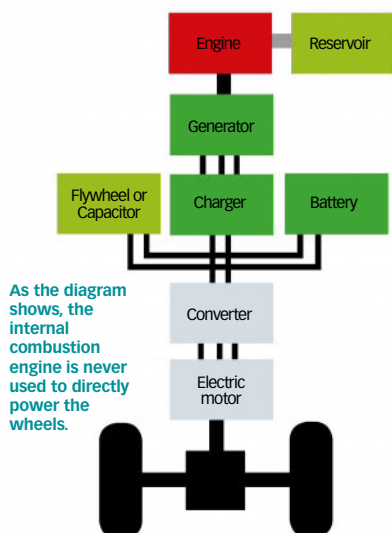
Series

Series hybrids are so-called because only the electric motor is used to drive the wheels, the internal combustion engine is only there to drive a generator which charges the electric motor during long distance driving. Essentially, these are really electric cars with an onboard generator that is powered by an engine.

The series hybrid drivetrain attempts to reconcile the weakness of the two forms of motors. Electric motors are highly efficient and provide good torque over a wide speed range, but unfortunately, batteries takes ages to recharge and charging stations are not as widespread as gas stations. On the other hand, the traditional internal combustion engine draws energy from fuel, which can be replenished quickly and easily. But, it is only at its most efficient when running at a constant speed.

As such, the electric motor provides the motive force, so that the internal combustion engine can be designed to run at maximum efficiency to power the generator.

Series hybrid vehicles are designed primarily for use in urban environments where commutes are generally shorter. This way they can be powered solely by batteries, thus keeping emissions down, and relying only on the internal combustion engines when trips out of town are required.

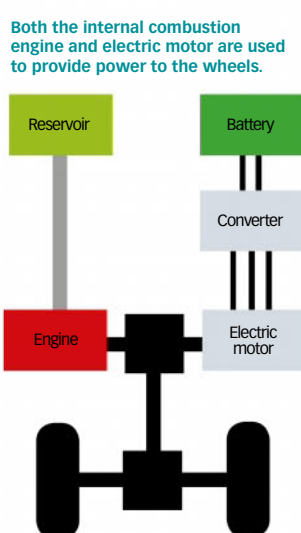


Parallel

Parallel hybrids get their names because their drivetrains are designed in such a way that the internal combustion engine and electric motor are powering the car at the same time. The premise behind the parallel hybrid drivetrain is for the electric motor to assist the engine in providing energy to the wheels, so that car makers can downsize the engine but still maintain the same level of performance.

Because the electric motor is only there to assist the engine and not take over duties completely, cars with a parallel hybrid drivetrain typically use smaller battery packs. The smaller battery packs along with the smaller engine helps reduce vehicle curb weight, which also helps improve overall fuel efficiency. Since cars with parallel hybrid drivetrains cannot run on batteries alone, they are also known as mild hybrids.

Since the batteries in parallel hybrid systems are small, they are typically recharged using regenerative braking or via the engine during cruising when power demands are low. Alternatively, if the drivetrain is setup such that the electric motor drives one axle and the engine drives the other, the batteries can be charged by loading the electrically driven wheels during cruising. Such a setup is capable of providing four-wheel-drive.



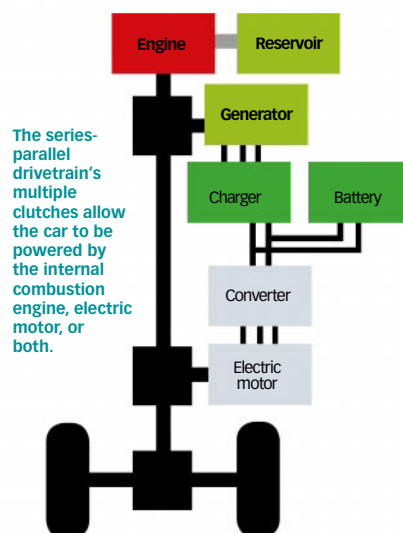
Series-Parallel

The series-parallel hybrid drivetrain, also sometimes known as the power-split drivetrain, is the most common system used in hybrid cars today. This was popularized by the Toyota Prius. It is the most complex, but it is claimed to offer the best efficiency because if designed correctly, the engine and batteries will operate at their most efficient points more frequently.

Unlike pure series and parallel drivetrains, the premise behind series-parallel drivetrain is flexibility in that the car can be powered by the electric motor and engine together or individually. Typically, this is achieved by coupling the engine, electric motor and gearbox and using automatically controlled clutches to control the drivetrain. For instance, if the car was running solely off the electric motor, the clutch between the internal combustion engine and the gearbox would be left open, while only the clutch between the electric motor and gearbox would engage.

In practical usage, what happens is that in low speed or stop-start environments such as in the city, the car will operate only using energy stored in the battery without the engine. This is where the electric motor is at its most effective because it produces maximum torque from a standstill, which is ideal for acceleration. At higher speeds or when cruising, the engine takes over because this is where the electric motor becomes less efficient.

Hybrids that utilize this type of a drivetrain are also known as full hybrids and some even offer plug-in charging capabilities.



DRIVING THE PORSCHE PANAMERA S E-HYBRID

Let's begin by addressing the elephant in the room. At over half a million dollars, the Panamera S E-Hybrid is by no means an affordable everyday car. And even if you consider its efficiency, there is no way the Panamera S E-Hybrid is going to be more cost-effective than an affordable model from a Japanese or Korean make. That said, the Panamera S E-Hybrid was the first plug-in hybrid to reach our shores and has one of the best hybrid drivetrains in the market today. Hence, it is a good starting point for us to get a taste of hybrid technology.

The Panamera S E-Hybrid is powered by a combination of a traditional internal combustion engine and an electric motor. The internal combustion engine is an Audi-derived supercharged 3-liter V6 that churns out 333hp, whereas the electric motor produces 70 kilowatt or around 95hp. Together, the car has a combined power output of 416hp and 590nm of torque. That's a respectable amount of grunt, sufficient to haul the car from 0 to 100km/h in just 5.5 seconds. So, despite the eco-friendly positioning of the Panamera S E-Hybrid, this car is still a properly fast Porsche.

The Panamera S E-Hybrid has three driving modes: E-Power, E-Charge and Sport. E-Power is the default setting that the car starts in; and in this mode,

the car is powered mostly by the electric motor and the internal combustion engine only comes on when absolutely necessary. To avoid drivers unintentionally summoning the supercharged 3-liter V6, an artificial step is added to the accelerator in this mode and the engine only comes on when drivers press beyond this point. As a result, the Panamera S E-Hybrid starts silently and this was slightly disconcerting experience for us since we were expecting to hear the rumble of the V6

"Despite the eco-friendly positioning of the Panamera S E-Hybrid, this car is still a properly fast Porsche."

when we started the car. Surprisingly, despite the Panamera S E-Hybrid weighing over 2 tons, the electric motor never felt insufficient or underpowered, though overtaking can be a little tricky. That said, it accelerates briskly enough and can even reach a maximum top speed of 135km/h on electric power alone.

More impressive, however, is its range. Porsche claims a maximum range of 36km is possible on a fully charged battery and we do not doubt it. Even on a half-full battery, we easily managed 20km. This is made possible by the efficiency in which the car recovers energy during normal driving. For instance, energy is recovered whenever the brakes are

applied and also whenever the car goes into coasting mode, the instances where the car is "gliding" without any motive force.

The E-Charge mode is, as its name suggests, the mode to use if you want to charge the batteries. In this mode, excess energy from the internal combustion engine is used to charge the battery. Together with the energy recovered during braking and coasting, the battery charges significantly quicker. In our experience, we managed to get the battery up to around 40% charge after about 30km.

Sport mode is the setting you want to be in to experience the full fury of the hybrid drivetrain. In this mode, full performance, from both the supercharged 3-liter V6 and the electric motor, is available at any time. Together, the engine and the electric motor produce a whopping 590nm and this can be easily appreciated whenever you dig your right foot deeper into the carpet. The immediacy of the electric motor helps fill out the torque gaps nicely and it is quite impressive to see a car as large and heavy as the Panamera S E-Hybrid surge forward with such urgency. And with the various suspension settings, one can really tune to the Panamera S E-Hybrid to feel and drive like a bona fide sports car, despite its eco-friendly positioning and immense mass.



The Long-term Viability of Plug-in Hybrids

Plug-in hybrids profess to offer the best of both worlds - the convenience of a traditional internal combustion engine cars and the eco-friendliness of full-electric cars. After spending a day with the Panamera S E-Hybrid, we are convinced of this claim.

For short commutes, it is possible for the Panamera S E-Hybrid to drive solely using electric power. This makes it excellent for city driving or in a small country like ours. And when you are done, the Panamera S E-Hybrid can be plugged in, charged and ready to go the next day. So if used in such a manner, the Panamera S E-Hybrid functions almost like an electric car, and its internal combustion engine is only called upon for longer distance commutes or when the driver needs more power for overtaking maneuvers. And even if your daily commutes are longer than



The interior is a plethora of buttons and switches.



The rear seats fold for even more boot space.



The Panamera S E-Hybrid can be identified by its acid green brake calipers.



The charging dock charges the car in just 4 hours.

the electric range, the hybrid drivetrain does a good job of extending the overall range of the car and its energy recovery systems are useful in recycling energy that would otherwise have been wasted.

However, the biggest hurdle for plug-in hybrids is the charging station. Porsche Singapore admits that the unique selling point of this car can only be realized if the driver has his own property so that the special Porsche charging station can be installed and used to charge the car. This predicament extends to all hybrid cars and not just the Panamera S E-Hybrid. Hence, significant investment needs to be made by governments to install charging stations in public and housing estates to fully appreciate the potential of plug-in hybrids. To complicate matters, there are also differences between the charging cables used for hybrids - European and Japanese makes requires cables with different connectors.

The market for cars in Singapore has always been an

unusual one because of the unique policies that we have surrounding car ownership. So while plug-in hybrids are touted as more efficient and cheaper to run, the reality is that the buyers who are usually in the market for such cars do not have access to a charging station nor can they install one as they please. As a result, plug-in hybrids, in Singapore at least, is really only viable for folks staying on landed property that can allow for the easy installation of charging docks.

In summary, plug-in hybrids, like any other cars that rely on alternative forms of fuel such as LPG, can only be viable if they receive the necessary infrastructure and support from the government. However, with car makers exploring other forms of alternative fuels such as hydrogen, it remains to be seen if the government would be willing to invest in the infrastructure required for the widespread adoption of both hybrid and full-electric cars. **HMM**



A GEEKY VALENTINE

by Salehuddin Husin

■ The problem with finding a gift for geeks is the fact that they most probably already have the latest gadgets that they want. Let's face it, just how many iPhone 6s or PlayStation 4s does someone need anyway? So, how do you get a geek excited about Valentines? Introduce more technology into their everyday lives; the quirrier the better.



■ **DJI INSPIRE 1** **WWW.DJI.COM**

If you think the Parrot Drone's too casual and entry level, the Inspire 1 will satisfy you completely. It's a drone that comes with a 4K camera that you can stream footage straight to a connected smart gadget, perfect for urban reconnaissance missions or making your own OK Go masterpiece. Get another controller and you've got the perfect geek couple activity, as you'll both be able to control the drone simultaneously, with one controlling flight while the other mans the camera.



■ **INTEL MICA** **WWW.OPENINGCEREMONY.US/MICA**

The MICA's the result of collaboration between Opening Ceremony and Intel. It's a smart device that combines every feature you'd need into a chic bracelet (being a geek doesn't mean you can't be fashionable). There's a discrete display at the base that informs you of all your important events (like catching the next episode of The Flash) as well as messages and other notices. The bracelet even vibrates to alert you when something requires your attention, without alerting anybody else to it.



■ **SKYLOCK SOLAR POWERED LOCK** **SKYLOCK.CC**

The Skylock Solar Powered lock is an automatic lock (you can manually unlock it too) that's solar powered, but the cool thing about it is that it hooks up with your smartphone and lets you control it with an app. You can even set it to auto unlock based on proximity. Who needs physical keys anymore? The Skylock isn't technically available yet, but if you're interested you can already pre-order it on the device's website.



■
ETON FRX5

WWW.ETONCORP.COM

The FRX5 is an emergency weather radio with lights and USB charging capability that can be powered via electricity, batteries, solar powered, hand cranked or by tears. Ok, maybe not tears. Apart from wind and water, there's pretty much no other energy source that the FRX5 doesn't cover. It's perfect for camping out, plus you can use it to charge up your drone when it's low on power too. Win win!



■
CASIO G'MIX GBA-400

WWW.G-SHOCK.COM

As a geek, being at the forefront of tech is important. Controlling your music via Bluetooth headphones? So passé. The G'MIX GBA-400 lets you do the same thing on your wrist and more. Feel like James Bond as you fiddle with dials. Instead of lasers coming out from your watch, it's invisible Bluetooth signals! Use those signals to find your phone if it's missing with the built in Phone Finder function or search for the music you want via Music Search.



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Every month behind the doors of our super secret gadget testing facility, the latest tech products are put through their paces using industry recognized benchmarks and our own blend of real world usage scenarios. Here are our findings.

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SONY A7 II
Unshakable full-frame.

AORUS X7 PRO
Super slim SLI gets updated, again.

LG MUSIC FLOW H7
Feel good wireless audio.

ASUS PADPHONE S
The convertible tablet-phone returns.



HOW WE RATE:

Products are rated on a scale of **1** to **10**; **1** being so abysmal, it should be a crime to sell it, and **10** being almost perfect. Come now, nothing is perfect. An Editor's Choice may also be awarded based on unique merits.



T E S T - FLATSCREEN 4K TV SHOOTOUT

VS

LG UB980T

•

PANASONIC VIERA AX800

•

SAMSUNG HU8500

•

TOSHIBA PRO THEATER
L9450





BEYOND HIGH DEFINITION

Buying a 4K TV now makes more sense than previous years due to the maturing standards. And more are due to arrive in a few months' time after CES 2015. If you don't want to wait, or don't intend to spend top dollar for the latest and greatest, here are some of the current high-end LCD models that you can pick up in the store right now.

Text by *Ng Chong Seng*

Photography by *Darren Chang*

Photography Assistant by *Angela Guo*

Art Direction by *Ken Koh + Ian Chong*

LG UB980T

While OLED TVs have seen price drops recently, they remain too expensive for most people, and limited in variety compared to LCD TVs. Which is why LG, who continues to invest heavily in OLED, still churns out new LED LCD TV series on a very frequent basis. Available in 65, 79, 84, and 98-inch screen sizes, the UB980T is LG's flagship 4K TV, and so naturally, it packs top-end specs and all the bells and whistles that the company can come out with, including an Ultra Clarity Index of 1,300, sound co-developed with Harman Kardon, a maximum 5.2-channel, 120W speaker system, a built-in 8-megapixel camera, support for 4K HEVC 60p decoding, and WebOS.

Now, the UI refresh brought about by WebOS is obvious right from the get-go. From tuning the TV channels, connecting to your Wi-Fi network, to pairing with the LG Magic Remote, you're guided by an animated character named Bean Bird. All of a sudden, boring and technical configurations now seem fun and easy. And it goes deeper: there's also a new launcher, a left-to-right scrollable straight line menu that runs along the lower portion of the screen. The idea is to allow you to browse through service or

content options without having to navigate away from the existing view, not to mention letting you watch a show, play a game, or browse the Internet while searching or downloading other content at the same time.

WebOS will also know when you plug in an external device and recognize what kind of device it is, and then pops up a menu with all the relevant options. And there's a Live Menu with channel and recording options that you can open and keep within easy reach while watching TV. The ability to resume playback (say, of a YouTube video) after you've switched inputs and come back to it is also delightful. All in all, even as a 1.0 release, we already like how WebOS has panned out on LG's TVs. We're excited to see how this year's WebOS 2.0-based TVs fare.

Design-wise, we're fans of LG's hardy 'stable screen', though not so much of the protruding stand that runs the wide of the panel. Connectivity-wise, you're pretty much covered by four HDMI ports (of which three support HDMI 2.0) and three USB ports. Along with support for Intel WiDi, Miracast, and MHL, you've got all the tools to get content on your mobile device onto the big screen at your disposal.



Refreshing WebOS UI. LG Sound designed by Harman Kardon.



Occasional UI sluggishness. Few rough edges in WebOS 1.0.



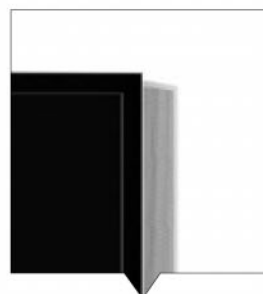
AT A GLANCE

HDMI Ports
4

3D
Passive 3D

Built-in Camera
Yes

Price
\$7,299 (65-inch)



The UB980T's front-facing speaker system sounded pretty good.



The TV has a built-in pop-up camera.



Point and click, use the scroll wheel, or speak to it, the Magic Remote offers various control modes.

PANASONIC VIERA AX800

In 2014, Panasonic introduced the Life+Screen category into its TV lineup. Reserved for its higher-end models that typically come with better image quality and more premium design, TVs carrying this badge - such as this AX800 - also sport the company's newest smart TV interface.

Taking center stage here is My Home Screen, which as its name implies, is a user-customizable home screen for your apps and content. It's also capable of giving you new content recommendations and lets you search for content using voice. And through the clever use of the built-in camera and proximity sensor, the screen can pop up information (e.g., time, notifications, weather) automatically when it detects you're near. Coupled with things like a media player that supports a variety of formats (including RMVB), easy mirroring of smartphone or tablet images onto the screen, DLNA support, and built-in Wi-Fi, Panasonic high-end TVs are every bit as smart as those from the two Korean giants. And for what it's worth, the AX800 has a dual-core processor to keep operations snappy.

Of course, for a TV, image quality is still the most important. Panasonic has abandoned the plasma technology in 2013,

and the AX800 (available in 58 and 65-inch screen sizes) is one of the first results of the company's renewed focus on LCD and 4K. Two key features here are the Studio Master Color panel and Studio Master Drive, which Panasonic says enables the TV to reproduce deep blacks and a wide color gamut. Aided by Panasonic's Local Dimming Pro tech (the AX800 is LED edge-lit), the company is gunning for a plasma-like performance on an LCD TV. We shall see if it succeeds in the coming pages.

Good picture presets. Suited for both average consumers and professionals.

Super-heavy stand. Only one 4K 50/60p-capable HDMI input.

For those interested in the nitty-gritty, yes, the AX800 has an HDMI 2.0 port that supports 4K 60/50p input. HDCP 2.2 and HEVC decoding, standard features found on 4K TVs launched in 2014, are also onboard. If you're looking for standout differences, then know that the AX800 is also THX 4K-certified and has a DisplayPort terminal.

The AX800 is also a 3D TV, and employs an active 3D system. 3D is a less prominently advertised feature these days, but there's also no denying that 3D content are much easier to get than 4K content. For the most part however, active 3D on a 4K panel doesn't offer much of a resolution improvement over active 3D on a 1080p set. If you're a fan of both 4K and 3D, we recommend that you take a look at LG's 4K TVs that use passive 3D.



AT A GLANCE

HDMI Ports
4

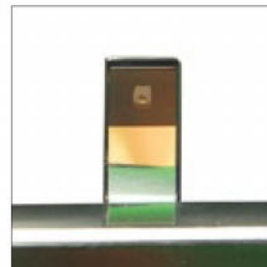
3D
Active 3D

Built-in Camera
Yes

Price
\$7,699 (65-inch)



Only one of its four HDMI ports supports 4K 60/50p input. But there's a DisplayPort input.



There's an integrated full HD camera on the TV.



We like the remote's big buttons and giant touchpad.

SAMSUNG HU8500

While Samsung has reserved its best technologies for its flagship HU9000 curved TV, the HU8500 (available in 48, 55, 65, and 85-inch screen sizes) is still very much a high-end TV, sporting features like a Clear Motion Rate of 1,000 (it's a 100Hz panel), a new local dimming method called UHD Dimming, a quad-core processor to ensure operation smoothness, and a built-in DVB-T2 tuner for tuning in to digital TV broadcast. But unlike the HU9000, the HU8500 lacks a built-in camera. Design-wise, we like that Samsung didn't try to be too fancy, and has gone for a simple brushed metal stand (non-swivel though) and a thin metal trim around the frame. The focus is on the giant panel, and rightly so.

Speaking of future-proofing, arguably our favorite feature of the HU8500 (in fact, for all of Samsung's 4K TVs) is its ability to upgrade to the latest hardware (sans the panel, of course) and software simply by plugging in an external box that Samsung calls the One Connect box or Evolution Kit down the road. With this upgrade path, your investment will not become obsolete as fast compared to other TVs. That said, it's not as if the HU8500 is lacking anything. Out of the

box, it already supports standards like HEVC, HDMI 2.0, MHL 3.0, and HDCP 2.2.

Samsung's 2014 Smart Control remote connects to the TV via Bluetooth, and is delightful to use. We find the touchpad handy for scrolling webpages; and even for menus that don't support it, there are arrow keys to fall back on (or you can just use the standard remote). On the UI front, Samsung continues to improve its Smart Hub interface, and this version has a new Multimedia panel that combines the previous Photo, Video, Music, and Social panels. Compared to LG's generous use of animations, it can still look a tad intimidating, especially to non-advanced users.

Another feature we like is Multi-Link Screen, a contextual multitasking mode that lets you split the screen real estate, so you can do things like having live TV on one half

of the screen and contextual search results on the Web browser, relevant YouTube video content, or a compatible app up on the other half at the same time. A Soccer mode that allows you to enlarge a selected area on the screen is also pretty nifty, but we aren't fans of the pumped up colors and contrast this mode brings.



Good set of smart TV features. Competitively priced.



Doesn't sport all of Samsung's top-end hardware features.

AT A GLANCE

HDMI Ports

4

3D

Active 3D

Built-in Camera

No

Price

\$6,499 (65-inch)



You can upgrade the TV's hardware if you get a One Connect box down the road.



If you want to do Skype video calls on the TV, you can get the optional VG-STC4000 camera.



We like the smart remote's four direction keys and touchpad; the latter is great for scrolling webpages.



TOSHIBA PRO THEATER L9450

To ensure that smart TVs remain easy to use, TV manufacturers have been sweating the user interface and user experience details in the last few years. We saw LG turning to WebOS in 2014, and Samsung's continued efforts to refine its Smart Hub interface. If you aren't a fan of either, Toshiba's Android approach provides another credible alternative.

Starting with the L4300 series in 2013 that came with Android 4.2 Jelly Bean, 2014 is the second year Toshiba is using Android as a smart TV platform for its TVs. In fact, the integration has now come to the Japanese company's 4K TV lineup, like the L9450 series we've here. Regardless of the Android version (this time, it's Android 4.4), the appeal is the same, and that is you get to enjoy the vast number of apps (including games) on the Google Play store on a big-screen TV. The only gripe we've here is that one can only download free apps, but not pay for apps through the TV. Otherwise, it's a very familiar environment that Android mobile users are accustomed to. Used to rearranging home screen icons, downloading interactive wallpapers, or setting up profiles for different users on your Android smartphone or tablet? You can do the same on the L9450.

Of course, being Toshiba's flagship 4K TV, the L9450 (available in 50, 65, and 84-inch

screen sizes) is packed with sophisticated hardware components and software features, including the company's third-generation Cevo 4K video processing engine for natural color reproduction and full HD-to-4K upscaling, Active Motion & Resolution Plus 3,100 that reduces motion blur during fast-moving sequences, DVB-T2 support for digital TV broadcasting, HDMI 2.0, screen mirroring,

and even a Football mode that attempts to render smoother footage, with better details and natural-looking grass. Sound isn't neglected either, and the 50 and 65-inch L9450 sport a compact 'Labyrinth' speaker system capable of 30W of audio output. The Labyrinth system isn't required on the giant 84-inch model, as its 40W system already goes very loud.

Knowing that most people don't tweak or calibrate their TVs, the L9450 also

incorporates two features - Intelligent Scene Optimizer and Intelligent Auto View - to ensure that you always get the best possible image quality. The former basically detects the content and input source to intelligently adjust picture and sound settings, while the latter analyzes signal and ambient lighting conditions to fine-tune the color management system (e.g., backlight, color temperature, gamma, saturation, sharpness) automatically. Oh, lest we forget, the L9450 is the only TV here that doesn't do 3D.

+
Easy to expand functionality through Android apps.

-
No built-in camera; doesn't support 3D.



AT A GLANCE

HDMI Ports
3

3D
No

Built-in Camera
No

Price
\$4,999 (65-inch)



The L9450 has three HDMI 2.0 ports at the side.



Of the TVs here, the L9450's stand is the easiest to assemble, and it looks good.



The key feature on this second and smaller bundled remote is the trackpoint stick.

FLATSCREEN 4K TV PERFORMANCE - LG UB980T

Decked with the best technologies that LG has to offer, the UB980T's mostly excellent image quality came as no surprise to us. The IPS panel went pretty bright in our tests, and that bodes well if you're the kind who enjoys plenty of sunlight in the living room. But be careful of positioning to avoid reflections.

With over 8 million pixels, the UB980T shone when fed with properly done 4K content. Case in point: the sharp footage and natural-looking colors of the dishes in the Food Odyssey 4K documentary that came in this 500GB hard drive that LG used to give to buyers of select 4K TV models couldn't be more lifelike. The Wolverine movie (also in the hard drive) also hardly put a foot wrong, and to quote our own notes, "the red strands of Yukio's hair were impeccably rendered".

With plenty of details, depth, and sharpness, 3D images also looked amazing on this passive 3D TV. If you love watching 3D content, the UB980T is the TV to get. Coupled with the 90W, 5.2-channel front speakers of our 79-inch test unit, we truly had a cinema-like experience.

That said, the UB980T wasn't without faults. Comparing out of the box performance, we found colors on the UB980T a tad muted than those on the Samsung HU8500. This is largely due to the IPS panel LG uses, which although improves viewing angles, also makes colors 'pop' less than rival panels. That said, the TV offers plenty of image controls (including a 20-point white balance control), so advanced users can tweak to their heart's content. For the average user, the ISF Expert 1 mode is a good preset for critical viewing; and it gave us accurate colors from the get-go. Unfortunately, the dreaded backlight blooming was present across all LED Local Dimming settings, but we managed to lessen the effect by lowering the backlight intensity. Lastly, resolution in fast-moving scenes remained good with TruMotion engaged.



The new launcher lets you browse through content options without having to navigate away from the existing view.



The colorful and bright image makes this TV great for daytime viewing.

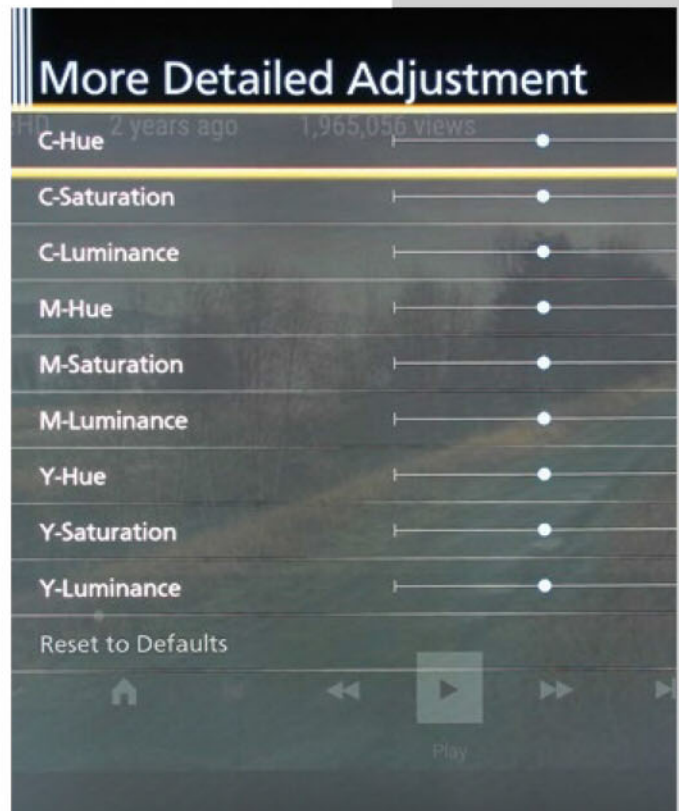
FLATSCREEN 4K TV PERFORMANCE - PANASONIC VIERA AX800

The AX800 exhibited very good color accuracy out of the box, helped no doubt by its excellent grayscale tracking. Panasonic has apparently designed this TV for critical watching, which is not hard to deduce from the pro-sounding pictures modes like Cinema, THX (Cinema and Bright Room), Professional 1, and Professional 2. The THX modes have a gamma response of about 2.2, the widely used standard for TV and film. The two Professional modes went close to 2.4, and both are excellent choices if you prefer a more contrasty image. Either way, the AX800 has a good suite of color management controls (including ISF controls), so it's not hard for well-equipped users to get near reference results.

In terms of black level response, the AX800 performance was as good as the Samsung HU8500, especially when the lowest Adaptive Backlight Control (which controls local dimming) was engaged. A letterbox dimming mode, akin to the Cinema Black setting we saw on Samsung's flagship curved TV but not on the HU8500, darkened the top and black bars even further. All little details that should delight enthusiasts who are buying this TV for dark room viewing.

All in all, image quality-wise, the AX800 hardly faltered regardless of the content we threw at it. *Superman Returns* still looked mighty good after upscaling, and the slight noise we observed in some dark scenes are inherent of the movie rather than the fault of the TV. There was a bit of dirty screen effect, though we think most people won't notice it.

Interestingly, the TV has a '1080p Pixel by 4pixels' mode for making 1080p images look good on a 4K display, but we found differences (vs. upscaling) to be minor after staring at the Blu-ray version of *Harry Potter and the Deathly Hallows: Part 2* for a good hour. Motion resolution was also high, thanks to Panasonic's well-implemented frame creation tech; and 3D images looked vibrant, and suffered slightly less crosstalk than the Samsung set.



The tons of professional controls will delight advanced users.



Minute banding aside, the AX800 has excellent upscaling and black level response.

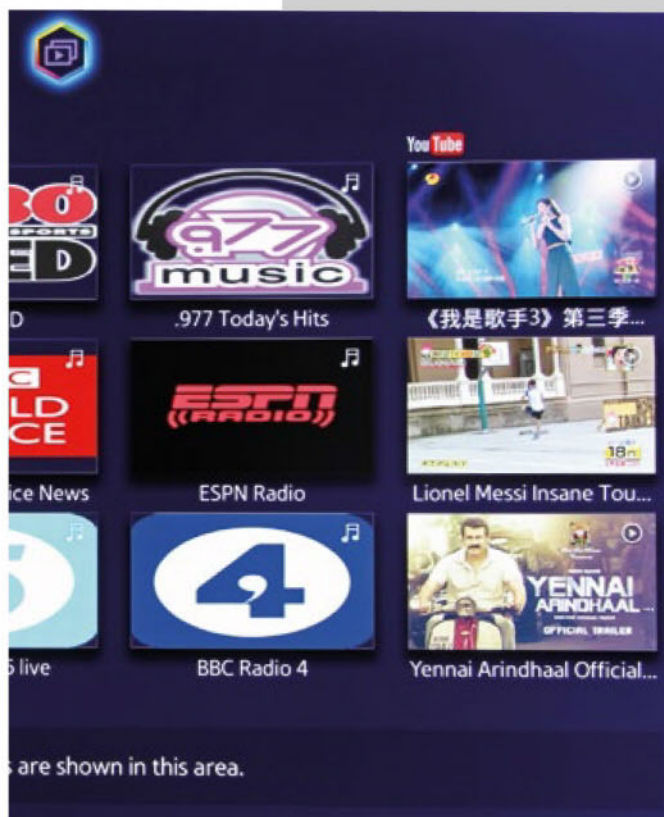
FLATSCREEN 4K TV PERFORMANCE - SAMSUNG HU8500

At a viewing distance of 1.5m, it was hard not to be impressed by the big screen and the boatloads of details that the HU8500 brought. Even though the HU8500 didn't come with the PurColor and Auto Depth Enhancer technologies like the curved HU9000, the sense of 3D-ness was very much present in the Grand Canyon Adventure, a 4K documentary that was on the Samsung UHD Video Pack (basically a hard drive preloaded with 4K material). In fact, using just the Standard picture mode and without doing any kind of calibration, we found images to exhibit just the right amount of 'pop'.

The HU8500 also excelled when we switched to 1080p content. Even though it had been upscaled, details in the Blu-ray version of Skyfall still looked super-sharp. We also didn't experience any judder for 1080p24 2D material.

Although the HU8500's local dimming method relied on fewer zones than the curved HU9000, we found the former's backlight control to work well across different types of materials. Sure, during low APL scenes in The Dark Knight, its black level performance, while good, was still no match for OLED TVs, but in movies with primarily high APL scenes and bright colors, it was capable of the brightest whites. The TV also exhibited very good motion clarity, thanks to effective black frame insertion implementation; even with the LED Clear Motion setting turned on, there was hardly any flicker. Lastly, 3D image brightness remained high, and the slight crosstalk of the active 3D system didn't ruin the viewing experience.

For audio, the small front-firing speakers into the TV's cabinet actually did quite a good job, as we could quite make out the many multi-directional audio moments in the Star Trek Into Darkness movie. The HU8500 also incorporates a Dolby MS11 multi-stream decoder that supports decoding of many of today's popular audio formats.



The streamlined Smart Hub UI makes finding what you want easier.



Deep blacks, wide dynamic range, and excellent upscaling are the hallmarks of this TV.

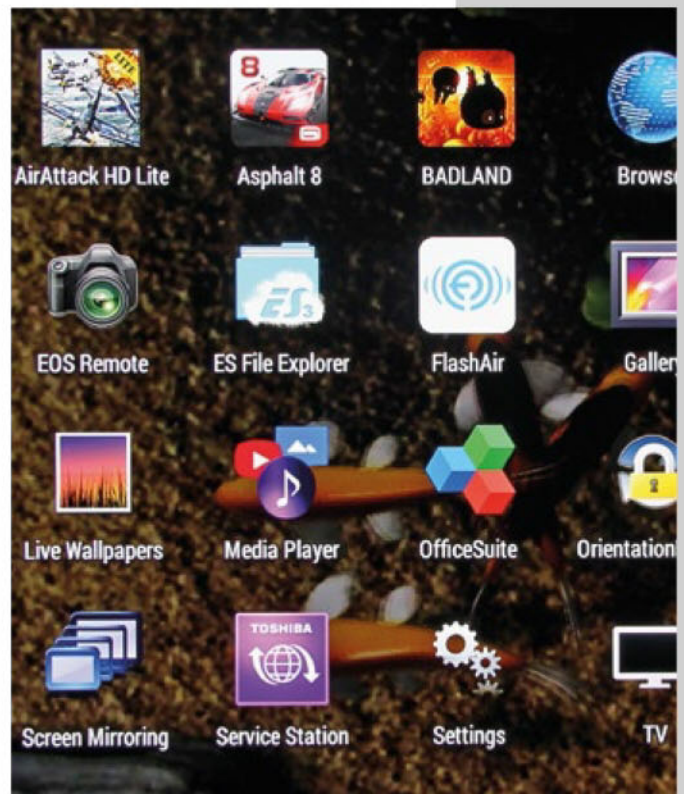
FLATSCREEN 4K TV PERFORMANCE - TOSHIBA PROTHeATER L9450

Interestingly, only the 50 and 65-inch L9450 use a wide gamut panel (the latter is the one we tested), which Toshiba says sports 14% wider color gamut than its 2013 lineup. Also, these two smaller models' panels go up to 75% brighter than last year's model, thanks to the use of direct LED backlighting with local dimming areas. The ginormous 84-inch model on the other hand uses an LED edge-lit backlight unit instead. So, buyers beware.

We observed wide viewing angles and accurate colors on the L9450. Like the LG UB980T, colors were well saturated but not crazily vibrant out of the box. Contrast, while good, didn't go as high as the Samsung HU8500. For an LED LCD TV, it exhibited high brightness (good news for those with bright rooms) and there wasn't much of a dirty screen effect. We attribute these to the new backlighting system and the pixel structure tweaks that let more light comes through.

The L9450 also had a decent showing when it came to black level response. Sure, the Panasonic and Samsung sets still fared better, but the L9450 wasn't far off. The difference was more apparent in a dark environment, as we saw more backlight transitions on the L9450. Reducing the backlight got rid of many of the distractions, but advanced users would not be pleased by the crushed shadows details.

Of course, with a 4K panel, the L9450 was capable of showing tons of details when fed with proper 4K signals. The Cevo 4K engine worked rather well, upscaling 1080p content to pseudo-4K convincingly enough. Motion resolution was noted to be very good, and credit for this has to go to the Active Motion & Resolution Plus tech. It's hard to decipher what the AMR+ 3,100 spec really means, other than the fact that it plays around with the refresh rate (likely 100Hz natively) and the backlight system to produce smooth, high-res images during motion.



The biggest draw of running Android OS? Apps, of course!



We applaud the L9450 for its bright picture, saturated colors, and clear sound from the Labyrinth speakers.

				
MODEL	LG UB980T	PANASONIC AX800	SAMSUNG HU8500	TOSHIBA L9450
TV TYPE	LED LCD	LED LCD	LED LCD	LED LCD
BACKLIGHT TYPE	Edge-lit with local dimming	Edge-lit with local dimming	Edge-lit with local dimming	Direct-lit with local dimming
RESOLUTION	4K (2,160p)	4K (2,160p)	4K (2,160p)	4K (2,160p)
REFRESH RATE	UCI 1,300	2,000Hz BLS IFC	CMR 1,000	AMR+ 3,100
SPEAKER OUTPUT	70W	18W	60W	30W
SMART TV	Yes	Yes	Yes	Yes
PLATFORM	LG WebOS	Panasonic Life+ Screen	Samsung Smart Hub	Android 4.4.2 KitKat
BUILT-IN CAMERA	Yes	Yes	No	No
3D SUPPORT	Passive	Active	Active	No
DVB-T2	Yes	Yes	Yes	Yes
HDMI PORTS	4	4 (1 supports 4K 60/50p)	4	3
DISPLAYPORT	No	1	No	No
USB PORTS	3	3	3	3
POWER CONSUMPTION	N/A	289W	246W	429W
DIMENSIONS (WITH STAND)	1,560 x 884 x 264mm	1,466 x 887 x 368mm	1,449.3 x 294.9 x 873.5mm	1,461 x 896 x 304mm
WEIGHT (WITH STAND)	39.9kg	59kg	28.4kg	26.5kg
PRICE (65-INCH)	\$7,299	\$7,699	\$6,499	\$4,999

AND THE BEST FLATSCREEN 4K TV IS



SAMSUNG HU8500

Let's get this straight: there's really no perfect 4K TV at the moment. We've given the nod to the Samsung HU8500 (the one we tested was the 65-inch UA65HU8500KXXS) simply because it made the fewest mistakes. In short, we noted excellent upscaling, very good black level response, and a good set of smart TV features. The pretty HU8500's ability to upgrade its hardware shouldn't be ignored too. The Panasonic AX800's image quality is equally good, but its UI is beginning to look dated and its speakers are a tad weak. The LG UB980T is also a good TV, especially for daylight viewing; and it has the best 3D performance. Its slightly weaker black levels and backlight control are what held it back. If you don't need 3D or prefer an Android UI, the Toshiba L9450 is worth considering. It has very decent image quality, though the UI is a bit clunky. For non-hardcore users, its sensible price tag is another big draw.

GOING WITH INK

The laser printer may still be king of volume in a large office, but inkjet printers are slowly taking over the home and small offices due to constantly improving print speeds, accurate color reproduction and lower ink costs. We look at three of the latest models to determine which is the best bet for your small office/ home office.

Text by Hafeez Sim

Photography by Jasper Yu

Art Direction by Ian Chong

Doc Test Page 2

Color

Doc Test Page 2



Page 3 of Printer Test Document [Text]

In making my selection I have chiefly tried to make the colors characteristic. It would have been easy, especially from Kennedy, to follow up a volume entirely filled with "Goblins" - a la Coltrane. But one can have too much of that very good thing, and I have therefore avoided as far as possible the more familiar "formulas" of the color literature.

She was the creature of fairest form, of loveliest aspect, and of gentlest nature that existed between earth and heaven in all Ireland—whatever colour of hue she had before, there was nobody that looked into her face but she would blush fiery red over it.

"Well, Connachar, we will not accept that offer from you, nor thank you for it. Greater by far do we prefer to go home to our father and tell the deeds of us, though you are so keen to shed their blood, and you would also, Connachar."

He came to the cow. "What n I'm seeking. Going back to us, through you, also, Connachar."

BMW Color

L555



VS
BROTHER MFC-J2720
•
EPSON L555
•
HP OFFICEJET PRO 8620

BROTHER MFC-J2720

The MFC-J2720 is Brother's flagship inkjet printer for 2014, and it comes with features that make it suitable for your small office. Scanning and fax is a given, though the MFC-J2720 also comes with duplex printing, so you won't need to manually flip the pages over when printing double-sided documents. A 50-sheet automatic document feeder (ADF) lets you print, copy and scan without having to attend to the printer. Unlike the other two printers in this shootout, the J2720 is able to handle A3 paper, so you can print photographs and spreadsheets that include more detail. Paper handling is also impressive, as it can handle 500 sheets of paper at a go with its dual paper trays. This puts it quite a bit ahead of the other two in terms of paper handling and also flexibility, as the two trays make it

easy to switch between printing different paper sizes.

And don't forget the multi-purpose tray, which handles up to 80 A4 sheets or five A3 sheets of paper, bumping up the paper handling quantity even further. You can skip using your computer to print as the MFC-J2720 lets you print JPEG files and compatible documents directly from USB flash drive, media cards or a PictBridge compatible camera. With built-in Wi-Fi, you can print directly from your iPhone, iPod Touch or iPad with the free Brother iPrint & Scan app. With the app, you can also bypass your computer and scan directly to your iOS devices. The MFC-J2720 has a

3.7-inch touchscreen control panel, and it's easy to use as well. You can also view the current ink levels, and the option to align the print heads is easy to find as well.



A3 printing. Large paper handling. User friendly touchscreen.



Average print speed.



AT A GLANCE

Print resolution

1,200 x 6,000 dpi

Scan resolution

2,400 x 2,400 dpi

Automatic duplex

Yes

Paper Handling

250 sheets (Standard Tray), 250 sheets (lower tray), 80 sheets (Multi-purpose tray)

Dimensions

490 x 345 x 308mm

Price

\$438



The Brother MFC-J2720 comes with two paper trays, and can store up to 500 sheets of paper.



It also has a 3.7-inch touchscreen display.



The MFC-J2720 can handle A3 paper.

EPSON L555

The Epson L555 has the smallest footprint among the printers tested here, so you will have no problems using this printer in a smaller office set-up. But even then, the L555 manages to squeeze in a 30-sheet automatic document feeder so you can print, copy or fax multi-page documents without having to manually feed each sheet. Paper handling is modest, as the Epson L555 comes with a single paper tray that can handle 100 sheets at a go. Inkjet ink cartridges aren't known to be expensive, and costs can go up quickly if you're doing a lot of printing. But the Epson L555 uses the ink tank system, so you can save a bit even if you're doing a fair bit of printing as the ink refill bottles cost US\$5.50. Unfortunately the Epson L555 is the only one

in this line-up that does not have automatic duplex printing, so you will have to manually flip the pages over when printing double-sided documents.

+
Compact.
Affordable ink tank.
Cloud support.

-
No duplex support.
Small paper capacity.

In terms of wireless printing and scanning, the Epson L555 seems to be quite competent. With built-in Wi-Fi and the help of the free Epson iPrint app, you can print webpages, documents and PDF files directly from both your iOS and Android devices. You can also scan and save directly to your iOS and Android devices, in addition to being able to upload the scanned files or documents to cloud services such as Box.net, Dropbox, Evernote or Google Drive. The L555 does not have

a touchscreen display, and comes with a conventional control panel and a two-line monochrome display.



AT A GLANCE

Print resolution
1,440 x 5,760 dpi

Scan resolution
1,200 x 2,400 dpi

Automatic duplex
No

Paper Handling
100 sheets

Dimensions
474 x 377 x 226mm

Price
\$399



The Epson L555 sports a conventional control panel.



It uses the ink tank system, which lets you refill the tanks yourself.



It has a 30-sheet ADF.

HP OFFICEJET PRO 8620

In terms of size the Officejet Pro 8620 is the largest here, so it might be a bit difficult for those with limited real estate in their offices. The Officejet Pro 8620 is in the middle of the pack when it comes to paper handling, with a 250-sheet input tray as well as a 50-sheet automatic document feeder. It also comes with a print duplexer, so there's no need to flip the pages yourself when printing double-sided documents. You can also scan documents to and print from a USB flash drive. You can connect the HP Officejet Pro 8620 to your office network through Wi-Fi or Ethernet, and print directly from your iOS or Android smartphone or tablet. And even if there's no network in your office, you can still print from

your smartphone or tablet as the printer has Wireless Direct, which is HP's own form of Wi-Fi Direct.

One thing unique about the Officejet Pro 8620 is that it comes with near-field communication (NFC), so in theory you can just tap an NFC-enabled smartphone to print a document or file. The Officejet Pro 8620 opts for a 4.3-inch touchscreen control panel, making it the largest among the three printers tested. It's generally easy to navigate the printer's interface, though for scanning you will have to use the desktop software to do so. While this approach offers you more control over your scanned files, it does delay

the scanning process if you want to scan something without adjusting any settings.



Comprehensive network support. Wireless Direct. NFC.



Bulky. Scanning can be a hassle.



AT A GLANCE

Print resolution

1,200 x 4,800 dpi

Scan resolution

1,200 x 1,200 dpi

Automatic duplex

Yes

Paper Handling

250 sheets

Dimensions

499.3 x 647.5 x 314mm

Price

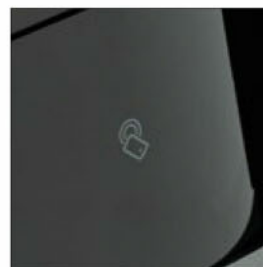
\$449



The Officejet Pro 8620 comes with a 4.3-inch touchscreen control panel.



The ADF can handle up to 50 sheets.



The Officejet Pro 8620 comes with NFC.

PRINTER PERFORMANCE - BROTHER MFC-J2720

The Brother MFC-J2720 sits right in the middle when it comes to print speed. Print speed for black and white documents is 17.9 pages per minute, but it did manage to outperform the HP Officejet Pro 8620 when it comes to printing color documents, with a print speed of 15 pages per minute. It takes the Brother MFC J2720 59.16 seconds to scan a 10-page color document job, and 18.99 seconds to scan an A4 full color photographic print.

The Brother MFC J2720 has the best text print quality among the three. It's the sharpest so there are definitely no problems in using the printer to print business documents. Detail and color saturation is similar to the Epson L555, so there's slightly less detail and color saturation when compared to the HP Officejet Pro 8620. Photo prints are slightly less saturated than the Epson L555, which has the best performance in this test. There's also a very slight yellow cast to the print.



There's a very slight yellow cast to the print.

Page 10 of Printer Test Document (Text)

In making my selection I have chiefly tried to make the stories characteristic. It would have been easy, especially from Kennedy, to [vi]have made up a volume entirely filled with "Grimm's Goblins" á la Celtique. But one can have too much even of that very good thing, and I have therefore avoided as far as possible the more familiar "formulæ" of folk-tale literature.

She was the creature of fairest form, of loveliest aspect, and of gentlest nature that existed between earth and heaven in all Ireland—whatever colour of hue she had before, there was nobody that looked into her face but she would blush fiery red over it.

"Well, Connachar, we will not accept that offer from you, nor thank you for it. Greater by far do we prefer to go home to our father and tell the deeds of heroism we have done, than accept anything on these terms from you. Naois, son of Uisnech, and Allen and Arden are as nearly related to yourself as they are to us, though you are so keen to shed their blood, and you would shed our blood also, Connachar."

The text is the sharpest among all three printers.

PRINTER PERFORMANCE - EPSON L555

Print speed isn't the L555's strongest suit, with the L555 having a print speed of 9.9 pages per minute for monochrome documents, and a print speed of 3.8 pages per minute. For some reason, it took the Epson L555 quite a while to scan a 10-page full color document job, with the printer managing to get it done after 5 minutes and 22 seconds. Thankfully, it took only 36.05 seconds to scan an A4 full color photographic print.

The Epson L555 text print quality is the weakest among the three. It's fine for internal documents and some business documents, but it might not impress your business partners or clients as some of the text is noticeably less sharp than its peers. There are no problems with color documents, though it's very similar to the Brother MFC J2720. Photo prints are the best among the three, with the Epson L555 producing vivid colors and accurate color casts.



Colors are vivid and accurate.

Page 10 of Printer Test Document (Text)

In making my selection I have chiefly tried to make the stories characteristic. It would have been easy, especially from Kennedy, to [vi]have made up a volume entirely filled with "Grimm's Goblins" à la Celtique. But one can have too much even of that very good thing, and I have therefore avoided as far as possible the more familiar "formulæ" of folk-tale literature.

She was the creature of fairest form, of loveliest aspect, and of gentlest nature that existed between earth and heaven in all Ireland—whatever colour of hue she had before, there was nobody that looked into her face but she would blush fiery red over it.

"Well, Connachar, we will not accept that offer from you, nor thank you for it. Greater by far do we prefer to go home to our father and tell the deeds of heroism we have done, than accept anything on these terms from you. Naois, son of Uisnech, and Allen and Arden are as nearly related to yourself as they are to us, though you are so keen to shed their blood, and you would shed our blood also, Connachar."

Some of the text is noticeably less sharp than its peers.

PRINTER PERFORMANCE - HP OFFICEJET PRO 8620

If print speed is on the top of your list, then the Officejet Pro 8620 will definitely not disappoint. With print speeds of 24 pages per minute for monochrome documents, and 12 pages per minute for color documents, the Officejet Pro 8620 is quick. That speed is also present when scanning documents and photographs, with the Officejet Pro 8620 taking 52.66 seconds to scan a 10-page color document job and 8.11 seconds to scan an A4 full color photographic print.

Text print quality sits right below the Brother MFC J2720. It's generally sharp but some fonts display a tiny bit of fuzziness when compared to the Brother MFC J2720. However, there's a bit more detail and color saturation for color documents. Photo prints are generally pleasing but exhibit less color saturation than the other two models.



Colors are less saturated when compared to the others.

HardwareZone.com / HWM Printer Test Document (Text)

In making my selection I have chiefly tried to make the stories characteristic. It would have been easy, especially from Kennedy, to [vi]have made up a volume entirely filled with "Grimm's Goblins" á la Celtique. But one can have too much even of that very good thing, and I have therefore avoided as far as possible the more familiar "formulæ" of folk-tale literature.

She was the creature of fairest form, of loveliest aspect, and of gentlest nature that existed between earth and heaven in all Ireland—whatever colour of hue she had before, there was nobody that looked into her face but she would blush fiery red over it.

"Well, Connachar, we will not accept that offer from you, nor thank you for it. Greater by far do we prefer to go home to our father and tell the deeds of heroism we have done, than accept anything on these terms from you. Naois, son of Uisnech, and Allen and Arden are as nearly related to yourself as they are to us, though you are so keen to shed their blood, and you would shed our blood also, Connachar."

Text is generally sharp but some fonts display a tiny bit of fuzziness.

AND THE BEST INKJET MFP IS



BROTHER MFC-J2720

The Brother MFC-J2720 may not be the fastest in terms of print speed in this shootout, but it does pretty close to the HP Officejet Pro 8620 that makes it reasonably fast enough for most day to day demands. It's a great all-rounder in terms of print quality too, with very sharp text plus sufficient color saturation and details in color documents. As an office printer though, we feel that the outstanding feature that puts it ahead of the rest is its paper handling. Out of the box, you can already load up to 580 sheets in total and the only one capable of A3 printing.

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GET SMART: THE WRIST WARS

The wearable device market is quickly becoming the most hotly contested space in technology. And for almost every company invested in the area, the most lucrative piece of real estate is your wrist. But with so many choices out there, which smartwatch is the best?

Text by *James Lu*

Photography by *Tan Wei Te*

Art Direction by *Ken Koh*





vs

ASUS ZENWATCH

•

MOTOROLA

MOTO 360

•

LG G WATCH R

•

SAMSUNG GEAR S

ASUS ZENWATCH

The ASUS ZenWatch is the only smartwatch in our shootout sporting a square shape face. That's not to say it's boring though. The ZenWatch's chassis is made from two layers of stainless steel sandwiching a classy rose gold steel midsection. While the ZenWatch's display may be square, the frame is rounded, and the display itself has a slight curve, softening the watch's appearance. These soft touches make the ZenWatch the most unisex and classy of the smartwatches in our shootout. Unfortunately, the bezel surrounding the screen is rather thick, and detracts from its overall sleekness.

The ZenWatch comes fitted with a soft tan-colored stitched genuine leather strap, with a metal deployant clasp, but you can easily swap it for any standard 22mm watchstrap if the color or style isn't to your liking.

Unlike the prominent buttons on our other smartwatches, the ZenWatch's settings button is hidden on the underside of the watch. It's fairly obvious that ASUS didn't design the button to be used often as it's actually quite tricky to press with the watch worn on your wrist. As such, the main points of interaction with the ZenWatch are through its touchscreen and voice commands.

The ZenWatch has a 1.63-inch, 320 x 320 pixel AMOLED display. On paper, the ZenWatch's 278 ppi should give it about the same clarity as the Motorola Moto 360, only

slightly worse than the Samsung Gear S and LG G Watch R. The reality however is quite different, as it's noticeably the worst of the lot. The display has a noticeable haziness, and the glass on top of the screen looks extra thick too.

Like the G Watch R, the ZenWatch is powered by a Qualcomm Snapdragon 400 processor and runs on Android Wear. ASUS has also included a few of its own apps, including some exclusive watch faces, and a

nice compass app. There's also a useful camera remote app that lets you use the watch as a viewfinder for your ASUS phone's camera. As with most smartwatches today, the ZenWatch includes a heart rate monitor and accelerometer for activity tracking. There's also an exclusive ASUS health and fitness app.

The ZenWatch has a unique way to measure your pulse. Instead of using an optical light sensor like most other wearables, you place two

fingers on each side of the metal frame at the same time, completing an electrical circuit. Unfortunately, this isn't any faster than other methods, and seems to be less accurate too, with erratic readings often over 100 bpm despite the fact that we hadn't done anything for the past five minutes.

Battery life on the ZenWatch was decent but not amazing. We were able to get about 18 hours out of it, but definitely requires charging every night.



Classy, unisex design. Useful exclusive apps.



Erratic heart-rate monitor. Thick bezel. Hazy screen.



AT A GLANCE

OS

Android Wear

Display

1.63-inch AMOLED

IP Rating

IP55

Dimension

51 x 39.9 x 7.9 ~ 9.4 mm

Weight

75g

Price

\$299



The ZenWatch's settings button is hidden on the underside of the watch.



The ZenWatch uses a clip on charging cradle that fits snugly onto the back of the watch.

MOTOROLA MOTO 360

The Moto 360 was the first round face smartwatch. It sports a sleek minimalist design complemented by a premium build of glass and stainless steel, with a leather strap made from high-end Horween Chicago leather. Having said that, while the Moto 360 is undeniably stylish, it does feel a little bulky on its thin strap, both in terms of width and overall height, and the net result makes it look more like a disc on a strap than a watch.

The watch boasts a large 1.56-inch 320 x 290 pixel resolution display (277 ppi) with fairly decent viewing angles and good brightness. Compared to the other round watch in our shootout, the LG G Watch R, the Moto 360's round screen is around 39 percent bigger, with much thinner bezels, which seems like it would be the better circular display, except for the fact that the Moto 360's display isn't actually a circle. In Motorola's quest for a round screen with the thinnest outer bezel possible, it ended up adding a little black bar at the bottom of the screen that cuts the circle off. That black bar houses an ambient light sensor for auto-adjusting screen brightness. It's not a total deal-killer, but for a watch with a beautiful, clean look everywhere else, this perfection-ruining flaw certainly stands out. As a result of the bar, white watch faces all end up looking like they have a little slice cut out of them, or even worse, a whole

section of dead pixels.

Like the G Watch R, on the side of the Moto 360, there's a little home button that looks like a watch crown that can be used to activate the watch or quickly bring up the settings menu. On the back of the watch, you'll find an optical green LED heart-rate monitor and inside, the 360 also has a pedometer for activity tracking. We found both the heart rate monitor and

step counter to be reasonably accurate, with fairly consistent results overall.

Like the G Watch R and ZenWatch, the Moto 360 runs on Android Wear, but unlike the Qualcomm Snapdragon 400 processors found in the LG and ASUS watches, the Moto 360 uses a considerably less powerful Texas Instruments OMAP 3 processor. As a result, transitions and animations are just a little bit slower on the Moto 360.

When the Moto 360 was first released, it was plagued with bad battery life. A recent firmware update has improved things but you'll still only get about 16 hours of life on a single charge, which is the worst in our shootout. The Moto 360 uses a simple inductive charging cradle to recharge, no magnets or connectors required. While it's a neat and simple design, it also has its drawbacks. You need a flat surface to set the charger down on, so if you try to recharge the 360 in your bag or on in an airline seat pocket you'll find that it won't stay in place.

+
**Beautiful glass.
Steel construction.
Large display.**

—
**Underpowered
processor. Weak
battery life.**



AT A GLANCE

OS

Android Wear

Display

1.56-inch LCD

IP Rating

IP67

Dimension

46 x 46 x 11.5mm

Weight

49g

Price

USD249.99



The 360 has a watch crown-style settings button located on the right-hand side.



The 360 uses an inductive charging cradle. Just put the watch on its cradle and it will start charging.

LG G WATCH R

Like the Motorola Moto 360, the G Watch R is a round-faced smartwatch, but with its bezel markings and recessed glass, it looks a lot more like an actual watch, instead of a disc on a strap. The watch's chassis is made from stainless steel in a matte black finish and it comes with a genuine black leather strap. The strap is a bit stiff, and isn't as nice as the leather used on the Moto 360 or ZenWatch, but it can be easily switched out for any standard 22mm watch strap. It's worth noting that while the bezel around the G Watch R's face looks like a diving bezel and has the relevant 5 minute markings, it doesn't rotate and is merely for show. Like the Moto 360, the watch has a non-rotating watch crown on the side that works as a home button. The overall look of the G Watch R with its chunky, angular build and black finish is definitely the most masculine of our watches, especially when compared with the ASUS ZenWatch, which is much softer and more unisex.

The screen on the G Watch R is recessed into the body of the watch, as opposed to the Moto 360's display, which actually sits slightly above the surrounding bezel. Android Wear requires a lot of edge to edge swiping, so you might find that the protruding bezel gets in the way, but personally, we quite liked the noticeable stopping point. The display itself is a 1.3-inch P-OLED screen with a 320 x 320 pixel

resolution (348 ppi). The screen is bright and ultra-sharp, with good viewing angles, and it probably has the best color reproduction of all of our smart watches as well. Crucially, unlike the Moto 360, the display is also a perfect circle, although the trade-off is a lack of an ambient light sensor so you'll have to manually adjust display brightness.



Beautiful fully circular P-OLED display. Good battery life.



Chunky, angular design may not suit everyone.

The back of the watch is plastic, and houses the heart rate sensor and magnetic charging connector. As with our other watches the G Watch R has an accelerometer for activity tracking. In our testing we found both the heart rate monitor and pedometer functions to be reasonably accurate and consistent.

Like the ZenWatch, the G Watch R is powered by a Qualcomm Snapdragon 400 processor and runs on Android Wear. LG has also capitalized on the G Watch R's round display

with a number of exclusive Android Wear watch faces, many of which mimic the look of high-end luxury watch faces.

The G Watch R was the best performer for our smartwatches when it came to battery life thanks to its huge 410mAh battery. We were able to get about 24 hours of battery life, even with the screen brightness set to the highest level. You'll still need to charge it every night via the magnetic clip on cradle, but you can probably stretch battery life to two days if you're unable to get to a power socket in time.



AT A GLANCE

OS

Android Wear

Display

1.3-inch P-OLED

IP Rating

IP67

Dimension

46.4 x 53.6 x 11.1mm

Weight

62g

Price

\$398



Like the Moto 360, the G Watch R has a faux watch crown that acts as a settings button.



The G Watch R's uses a magnetic charging cradle that snaps to the back of the watch.

SAMSUNG GEAR S

The Samsung Gear S is the only smartwatch in our shootout not powered by Android Wear. Instead, it uses Tizen, an open source OS that, like Android, is based on Linux. With its huge display, metallic bezels and home button beneath the screen, the Gear S looks a lot more like a tiny curved smartphone strapped to your wrist than a traditional watch. While other smartwatch manufacturers have veered towards more fashionable designs, Samsung seems to be fully embracing the computer on your wrist style, and the Gear S's thick housing, chunky metal clasp and rubber strap is definitely more geek than chic. While its curved form factor makes the Gear S quite comfortable to wear, it's also ridiculously large, probably too big for most women's wrists.

Where the Gear S tries to win you over is with its unique capabilities. It's the only smartwatch in our shootout with its own micro-SIM card slot and 3G modem inside. That means using it without pairing with a smartphone. You can make and receive calls directly, thanks to its built-in speakers and microphone, plus even respond to emails using a tiny onscreen QWERTY keyboard, although honestly trying to type on a 2-inch screen with one finger is just absurd. You're much better off with voice recognition, but Samsung's Tizen-based voice input isn't quite as good as

Android Wear. It works, but it often takes a few attempts to get it right. While we enjoyed the novelty of making voice calls with the Gear S, ultimately, you're still better just getting out your smartphone.

The Gear S has a curved 2-inch AMOLED display with a 480 x 360 pixel resolution (300 ppi), making it the largest smartwatch display currently available. It is super vibrant and colorful with great viewing angles, but one quirk worth noting is that some of Samsung's older Gear apps aren't optimized for it so they end up looking a bit stretched out and distorted. The Gear S's huge display does have some benefits though. Thanks to its great contrast and large size, it's one of the best smartwatches for reading content and the big curved screen makes vertical scrolling easy too.

With the Gear S running on Tizen, you won't be able to use any Android Wear apps with it;

instead, it has its own Gear App marketplace. There is less choice of course, but the few winners to take note of include the Nike+ running app (which is still in development for Android Wear).

Despite having the smallest battery size, battery life on the Gear S was surprisingly decent, especially considering its 3G modem and large display. We were able to get about 20 hours out of it on one charge.



Built-in 3G modem lets you use it without pairing with a smartphone. Huge, vibrant display.



Too big. Looks nerdy. Limited app selection.



AT A GLANCE

OS

Tizen

Display

2-inch AMOLED

IP Rating

IP67

Dimension

58.1 x 39.9 x 12.5mm

Weight

67g

Price

\$498



The Gear S has a rectangular settings button beneath the screen, just like a smartphone.



The Gear S charging cradle snaps onto the back of the watch.



MODEL	ASUS ZENWATCH	MOTOROLA MOTO 360	LG G WATCH R	SAMSUNG GEAR S
OS	Android Wear	Android Wear	Android Wear	Tizen
DISPLAY	1.63-inch AMOLED	1.56-inch LCD	1.3-inch P-OLED	2-inch AMOLED
RESOLUTION	320 x 320 (278 ppi)	320 x 290 (277 ppi)	320 x 320 (348 ppi)	480 x 360 (300 ppi)
IP RATING	IP55	IP67	IP67	IP67
STRAP TYPE	Standard 22mm leather with clasp deployment	Custom leather strap with pin buckle	Standard 22mm leather with pin buckle	Custom rubber strap with clasp deployment
PROCESSOR	Qualcomm Snapdragon 400	Texas Instruments OMAP 3	Qualcomm Snapdragon 400 1.2kg	Qualcomm Snapdragon 400 USB, 3.5mm aux in, Power adapter
SENSORS	19-Axis (Gyroscope, Accelerometer, Compass), Biometric heart rate monitor	Pedometer, Optical heart rate monitor, Ambient Light	9-Axis (Gyroscope, Accelerometer, Compass), Heart rate monitor, Barometer	9-Axis (Gyroscope, Accelerometer, Compass), Heart Rate, Ambient Light, UV, Barometer
BATTERY	370mAh	320mAh	410mAh	300mAh
DIMENSIONS	51 x 39.9 x 7.9 ~ 9.4 mm	46 x 46 x 11.5mm	46.4 x 53.6 x 11.1 mm	58.1 x 39.9 x 12.5mm
WEIGHT	75g	49g	62g	67g
PRICE	\$299	USD249.99	\$398	\$498

THE BEST SMARTWATCH IS



LG G WATCH R

Unlike smartphones, which are basically rectangular slabs with screens on them, smartwatches have a lot more room to play with different form factors, styles and even display shapes. With that in mind, the two watches that stood out to us were the Motorola Moto 360 and LG G Watch R. While there's nothing wrong with traditional square-face watches (in fact, we quite like them), they just look too much like tiny computers strapped to your wrist. Between the Moto 360 and G Watch R, while we liked the minimalist style of the Moto 360, but the black bar that cuts off the bottom section of the screen ruins an otherwise elegant design. On the other hand, the G Watch R's chunky, angular black aesthetic looks more aggressive and masculine but it also looks a lot more like a watch, especially with its faux diving bezel. Its excellent battery life, gorgeous crisp display, ability to take any standard 22mm watch strap and snappy processor sealed the deal for us.

HOMEPLUG GROWS UP

Sineoji PL1800EP

AT A GLANCE

Chipset

Broadcom BCM60500

Standard

HomePlug AV2 MIMO

PHY Data Rate

1800Mbps

Ethernet

10/100/1000Mbps

Price

\$159 (pair)



The PL1800EP features a noise-filtered pass through socket. If you have an electrical device that may be interfering with HomePlug speeds, try plugging it here instead.

CONCLUSION

MIMO technology gives the Sineoji PL1800EP adapter the boost it needs for viable high bandwidth power line networking.

The premise of power line networking is simple. You have a pair of HomePlug adapters; one goes into a socket next to your router and the other into the socket of the room that you wish to extend your network to. It is cost effective and doesn't require additional setup or cabling. The problem with power line networking is that every home is wired differently, which can greatly affect network performance. Also, signal noise generated by other electrical equipment, from phone charger to TV to washing machine will also interfere with speeds.

This is the reason that the number you see on a HomePlug product and the actual speed you get in your home can wildly vary from room to room and user to user. This is also why HomePlug has never been a viable solution if you need sustained data rates for high bandwidth tasks like gaming or media streaming.

Sineoji's newest PL1800EP aims to change that. Instead of the more

common Qualcomm/Atheros chipsets, the PL1800EP uses a Broadcom BCM60500 chipset, which supports the HomePlug AV2 standard and MIMO beamforming technology. This supposedly allows the PL1800EP to utilize all three electrical wires (Live, Neutral, Ground) in your home to transmit data as opposed to just a single wire of past-gen products. Theoretically, you should experience higher data throughput and a more stable connection.

As its name implies, the PL1800EP carries a max data rate of 1800Mbps. Now, remember that the number on the box is the ideal rate capable of the chipset with zero interference in a controlled lab setting. Once you plug it into a live socket, all the environmental factors mentioned above comes into play. When asked, Sineoji themselves put real world speeds at an average of 200Mbps. During testing, I was able to achieve an average of 115Mbps when routing my network from the

fiber point in the hall to my router in the study. Sineoji is working on a new firmware to improve speeds to meet their claims. I tested this new firmware, and got up to 150Mbps. I also tested the same adapters on another home, and achieved 190Mbps on average.

So, while the new firmware should improve performance, how much you gain will still depend on your home wiring.

Still, compared to the 45Mbps to 60Mbps achieved on past gen HomePlugs, the PL1800EP proves that the 100Mbps barrier is not just achievable, but also sustainable.

by Zachary Chan

TESTED & RATED

8.0_{/10}

HWM
SINGAPORE





AT A GLANCE

Protection

Triple layer (slipcover + shell + holster)

Dimensions

150 x 79 x 15mm

Weight

70g, 128g (with holster)

Price

\$69



Customize your protection to go with your mood or even outfit of the day.

CONCLUSION

Excellent protection for those that really need it, but inner hard shell could have been slimmer to reduce bulk.

BULKY PROTECTION

Otterbox Defender for iPhone 6

Smartphones are getting slimmer with each generation and if the iPhone 6's bend-gate saga has taught us anything, it's that investing in a proper case isn't just a fashion statement, but a must-have requirement. If you lead a rough and tumble lifestyle, the Otterbox Defender is probably the first thing that pops into mind.

This triple-layer case comes in a two-piece inner shell comprising of a plastic hard case at the back and a snap-on plastic front that holds both together. This doubles as a screen protector, which saves you the trouble of getting one separately. However, be warned that the built-in screen protector does reduce screen sensitivity somewhat, requiring more pressure to register taps. As the film covers the Home button, Touch ID sensitivity is affected too. Also, the screen has neither anti-glare nor privacy options; you can choose to install your

own, but that'll just reduce sensitivity even more.

Application of the inner shell can be a hassle as the clips are very tight and not easy to separate; I actually chipped my nails trying to pry it loose. I would have preferred if Otterbox designed it with a sliding lock mechanism, but thankfully, it's a one off inconvenience (unless you change cases often).

Once the inner shell is secured, the final layer of protection comes in the form of a silicone outer slipcover. This significantly adds to the iPhone 6's presence and actually made an Apple representative think I was using an iPhone 6 Plus instead. Still, this is the price you pay for ultimate protection. Besides providing added grip and friction that prevents your phone from slipping off tables, it also offers excellent shock absorption if your phone does fall. I've (accidentally) dropped my phone during the course

of this review—once even hitting a metal railing—to nary a dent or scratch.

Because of its silicone cover and front screen, you can wipe off accidental splashes, but the case itself isn't designed to offer water-resistance. It is also sealed from dust, but the slipcover itself has a tendency to collect dirt around the edges and can get stained. My Deep Water Blue case looked pretty seasoned after two weeks of use; something to take note off if you plan on getting a lighter color combination.

by *Tarin Teo*

TESTED & RATED

7.5_{/10}

HWM
SINGAPORE



THIRD GEN GAMER

Gigabyte P35X V3

AT A GLANCE

Processor

i7-4710HQ @ 2.5 GHz (Turbo Boost up to 3.5 GHz) with a 6MB L3 cache

Display

2,880 x 1,620 15-inch WQHD+, anti-glare

Graphics

NVIDIA GTX 980M (8GB DDR5)

Memory

16GB DDR3L

Price

\$4,299

Gigabyte's P35 line of laptops have been around for while. In fact, it bears a pretty impressive distinction of having three separate graphics card configs in the same series.

The original P35, the P35K, had a NVIDIA GeForce GTX 765M. When the P35 was updated, it was updated into two different variants, the P35W V2 and the P35G V2. The hardware in the P35W and P35G were mostly identical, except for one main component. The P35W had a 870M while the P35G had the weaker 860M. And now, we finally get a P35 with the latest of NVIDIA's GeForce GTX 900M series inside. Like the previous refresh, the

latest P35 has two variations, the P35W V3 (with GTX 970M) and the P35X V3 (GTX 980M).

The Gigabyte P35X V3 features a matte plastic chassis. It doesn't really stand out and demand your attention like some notebooks (such as the Aorus series) but its spartan design might appeal to those who like their machines clean and unassuming.

Like most notebooks, the Gigabyte P35X V3 features a chiclet-style keyboard, and similar to the keyboard on the Aorus X7 Pro, the one here seems to get smudged way too easily when compared to other notebooks. Also, there are

no macro keys or any special features present other than a backlight. The smooth matte texture of the trackpad lets you move your finger around with minimal resistance and effort but the lack of a groove to differentiate left and right mouse buttons as well as the lack of physical buttons might put some off.

As a gaming machine, the P35X V3 has a few things going in its favor. It uses a 15 inch WQHD+ display that's leagues beyond most Full HD monitors available on most other gaming notebooks and it has the muscle to play games at that higher resolution due to it packing the GTX 980M. While there's not a huge leap in quality



The P35X V3 comes with a DVD-RW optical drive, although you can swap it out for a Blu-ray drive or an extra HDD.



The keyboard's as basic as it can get. No special features or anything to set it apart.

CONCLUSION

Good performance, but for the price, you might as well go for the Aorus X7 Pro.

from Full HD (1,920 x 1,080) to the WQHD+ (2,880 x 1,620), there is a noticeable difference in visual fidelity nonetheless.

As a single GPU machine though, you can expect games running at this resolution to lose a chunk of FPS if you plan to play at the highest settings (Middle Earth: Shadow of Mordor for example). They're still playable mind you, and the ones we tested still managed to hit the minimum 30 FPS threshold for a satisfactory experience.

There being an optical drive (which is becoming a rarity) is also a plus point due to the convenience of being able to read physical media without needing an external drive. You can also swap it out for a Blu-ray drive or even more storage capacity with an addition HDD.

Still, it's a bit lacking in features and processing speed. Whereas other

gaming notebooks use the more powerful Intel Core i7-4870HQ or the i7-4980HQ processors, the P35X is using the i7-4710HQ. While its basic speed of 2.5GHz may be the same as the i7-4870HQ's, it can only be turbo boosted to 3.5GHz, unlike the 3.7GHz on the i7-4870HQ. When we benchmarked its performance, the P35X V3 was consistently outperformed by the superior MSI GT72 2QE Dominator Pro despite having the same graphics card. The only difference between the two was mainly in the processors, which shows that despite most people focusing on the graphics cards, processors still do make an impact on performance, especially in notebooks.

The P35X V3 has a top of the line graphics card and a great display, but we couldn't help but feel that it's a bit of a shame that processor is the weak link in the whole

scheme of things. That said, as a gaming machine, it also doesn't really come with many frills. There are no dedicated macro keys like the Aorus X7 series or customizable backlights like those from MSI's range. In a world of high-end gaming notebooks, the P35X V3 seems rather plain.

Now, we don't actually have a problem with that if it was meant to be a mainstream alternative to the more powerful Aorus X7 Pro. However, the P35X V3 is priced exactly the same. The only advantage it has, and apparently what you're paying a premium for, is its higher resolution screen. As a single GPU gaming notebook, it can certainly hold its own against the competition, but we'd have preferred if Gigabyte made a better distinction between the P35 and the Aorus line.

by Salehuddin Husin



TESTED & RATED

8.0 /10

HWM
SINGAPORE

A SLEEK, PORTABLE AND WATERPROOF COMPANION

Sony Xperia Z3 Tablet Compact

AT A GLANCE

Operating system
Android 4.4.2 KitKat

Display
8-inch
1,920 x 1,200 pixels
(283ppi) TFT

Processor
Qualcomm Snapdragon
801 2.5GHz

Dimensions
213 x 124 x 6.4mm

Storage
16GB internal storage
with microSD support
up to 128GB

Price
\$698



Sony even sells a Game Control Mount (\$48) that lets you mount the Z3 onto your PS4 controller.

Sony's Xperia Z3 Tablet Compact is the company's first foray into the 8-inch tablet category, putting it in the same bracket as the Apple iPad Mini 3, LG G Pad 8.3, and Samsung Galaxy Tab S 8.4. Sony's OmniBalance design of the Xperia Z range has remained mostly unchanged since its inception.

Fortunately, it's a pretty good look and Z3 Tablet Compact carries it well.

At just 6.4mm, the Z3 Tablet Compact is remarkably skinny - in fact, it's even thinner than the iPad Mini 3, and Samsung Galaxy Tab S 8.4. While its slender size does make it look and feel very premium,

it does feel slightly fragile, and you definitely don't want to accidentally sit on it.

The tablet is light too, and can easily be held one-handed for an extended period of time, as it weighs just 270g, making it 61g lighter than the iPad Mini 3 and 28g lighter than the Galaxy Tab S 8.4. Sony has been able to keep the weight down by reducing the amount of metal in the build. The Z3 tablet also loses the glass rear of its smaller smartphone siblings, in favor of a matte, textured plastic back. Like all of Sony's Xperia Z range, the Z3 tablet is completely dust and waterproof, and is

rated IP 65/68. That means you can safely use it at the pool - or even in the pool if you really want.

The Z3 Tablet Compact's 8-inch display has a 16:10 aspect ratio making it quite a bit longer than it is wide. By comparison, the iPad Mini has a 4:3 ratio, which makes it a bit boxier. The 16:10 ratio makes the Z3 perfect for watching movies in landscape orientation, but content can look slightly stretched in portrait mode.

The display itself has a full HD 1,920 x 1,200 pixels resolution, which gives it 283ppi, lower than both the iPad Mini 3's Retina display (326ppi) and Galaxy Tab S 8.4 (359ppi). Nevertheless,





At 6.4mm, the Z3 compact tablet is the thinnest 8-inch tablet available right now.

CONCLUSION

Probably the best 8-inch Android tablet available right now. It's sleek, lightweight, powerful and waterproof.

while disappointing on paper, in reality the Z3 tablet's screen is very crisp and sharp for its size, and honestly it's hard to tell the difference between it and the iPad Mini 3's Retina display. The display also has great viewing angles and vivid colors that rival that of Samsung's Super AMOLED display.

Unfortunately, camera performance on the tablet is quite poor, with the 8-megapixel rear camera a big step down from the 20.7-megapixel shooters you'll find on the Z3 phones. Additionally, like the iPad Mini, it doesn't have an LED flash so you'll have to provide your own lighting. The 2-megapixel front-facing camera isn't great either; it's just about acceptable for video calling, but that's about it.

The Z3 tablet runs on Android 4.4.2 KitKat and includes Sony's usual enhancements and add-ons. Sony's standout feature is Remote Play, which links

with your Sony Playstation 4 via Wi-fi and lets you use the tablet as a remote display. The PS4 still does all the processing, but it streams the content to your tablet display, letting you continue your game while your TV is off or being used for something else, when you don't feel like getting out of bed or, of course, when you're on the toilet.

The tablet is powered by a Qualcomm Snapdragon 801 processor and 3GB RAM. In our benchmark tests, it performed very well, outscoring the iPad Mini 3 and Galaxy Tab S 8.4 on most tests. Battery life was also excellent, with the Z3 tablet lasting over ten and a half hours on our video looping benchmark.

If you're in the market for a high-end 8-inch Android tablet, right now, you should only be considering two choices, the Samsung Galaxy Tab S 8.4 and the Sony Xperia Z3 Tablet Compact. Between the two, the Tab S 8.4 has a slightly

larger, higher resolution screen and marginally longer battery life. In all other areas, the Z3 Tablet Compact beats it. It has a slimmer, sleeker and lighter build that makes it more portable than the Tab S, and more importantly, it's also fully waterproof so you don't have to worry about using it at the beach or pool. Finally, if you've got a Playstation 4, the choice should be obvious - the Z3 has great synergy with the PS4 thanks to its Remote Play feature, and its 8-inch screen is just the right size for some in-bed gaming.

by James Lu

TESTED & RATED

9.0_{/10}

HWM
SINGAPORE

AT A GLANCE

Battery Life
8 Hours

Dimensions
62 (diameter) x 58
(height)mm

Weight
169g

Price
\$149



The Piccadilly is small enough to fit in the palm of your hand.

CONCLUSION

The Piccadilly is a sweet sounding pocketable speaker you'll love to bring around.

TESTED & RATED

8.0_{/10}

HWM
SINGAPORE

SOUND ALL AROUND

Moss Audio Piccadilly

"Cute and fun" might be one way to describe Moss Audio's first line of speakers, but that wouldn't be entirely accurate, as the Moss Piccadilly speakers represent a shift away from today's convention of assembly-line production for quick, reproducible results back to the painstaking hand-craft methods of old.

You see, every speaker is precision cut from a single block of solid resin (consisting of acrylic mixed with natural mineral powder), and then hand-polished for the final gloss finish. The choice of using an acrylic composite material contributes largely to the quality of the sound the speaker produces, as it is both stiff and well damped, meaning you won't get additional noises from the vibration of the speaker walls, and the speaker walls won't flex easily making it solid enough for transport.

Because the speaker is circular in shape and faces upwards, the sound goes out fairly evenly in all directions, but you probably won't want to be sitting too far away from it. We'd say it's perfect for intimate listening sessions around a dining table, but not so much for a party situation where you're trying to fill a room with sound.

In our testing, we found that the Piccadilly performed best with pieces that involved vocals, as the speakers display good warmth and clarity, with a sweet spot in the midrange. For example, on unplugged version of Hotel California by The Eagles, the vocals of Don Henley stand out with great presence and clarity, while there was good separation between the multiple backing instruments and the vocals.

The speaker manages to recreate the live

atmosphere fairly well, but lacks just that little bit extra on both ends of the spectrum. Guitar notes lack that final bit of ring you get from a hammer-on or a pull-off, and the bass notes lack that last bit of thump that lend to the fullness of a bass note. It's like a slightly mellow audio profile that stays firmly in the middle ground so that neither extreme troubles the speaker.

That's an approach that lends itself well to general listening at all volume levels, and we certainly didn't experience any distortion even at close to maximum levels. Critical listeners may begrudge the fact that some songs miss that extra bit of sparkle, but that's perhaps asking too much of a single unit speaker this small and this portable.

by *Marcus Wong*





AT A GLANCE

Operating system
Android 4.4.2 KitKat

Display
5-inch
1,920 x 1,080 pixels
(441ppi) Super IPS+

Processor
Qualcomm Snapdragon
801 2.3GHz

Storage
16GB internal storage
with microSD support
up to 64GB

Price
\$449



The PadFone S can be docked into an optional docking station to turn it into a full 9-inch tablet.

CONCLUSION

A very affordable 2-in-1 hybrid smartphone, but with compromises in design and build.

AN AFFORDABLE PADFONE

ASUS PadFone S

The ASUS PadFone series has been around for two years now, and continues to be the only 2-in-1 phone-tablet hybrid around. The basic form factor has remained unchanged since the original PadFone was released in April 2012, where the smartphone can be docked into a tablet shell, turning it into a full tablet device.

At 10mm, the PadFone S is significantly thicker than other flagship models. In fact, it's actually thicker than the first generation PadFone, which was 9.2mm. Despite its bulk, the phone isn't too heavy, coming in at 150g, which is slightly over average but nothing too alarming. Like the PadFone Infinity, the PadFone S sports an aluminum frame with chamfered edges. However, the rear gets a downgrade design-wise as it's now a removable polycarbonate plastic. It feels quite cheap, and it's certainly not up to the quality of previous PadFones that sport aluminum backing. Despite the rear cover being

removable, the battery is sealed and can't be removed. This time round, the optional tablet docking station comes in a 9-inch form factor, for an additional \$199.

The phone is equipped with a 5-inch Super IPS+ LCD screen, with a 1,920 x 1,080 pixel resolution. This gives it a pixel density of 441ppi, which yields very crisp and sharp images. You also get a 13-megapixel rear camera, which performs fairly well under normal lighting conditions.

The PadFone S runs on the fairly powerful Qualcomm Snapdragon 801 2.3GHz processor, with 2GB of RAM. Benchmark performance was generally quite good, and compared favorably to other, more expensive, flagship smartphones. Battery life, however, was slightly under average, lasting only 7 hours on our video looping benchmark.

Overall, the new PadFone S is an interesting proposition. On the one hand, at just \$449, it's very

affordable. The Infinity's \$899 launch price was a lot to ask for, especially for such an eccentric design, but \$449 might just be low enough for anyone intrigued with its hybrid proposition. On the other hand, the PadFone S is probably the worst PadFone advancement ASUS has ever made, with the low price resulting in cutbacks in both design and build materials.

Having said that, there's still lots to like about the PadFone S. Even if you ignore its docking tablet capabilities, you're getting a lot of value for its price with flagship-level performance and camera quality.

by Py Ho

TESTED & RATED

8.0_{/10}

HWM
SINGAPORE

AT A GLANCE

Mount

Sony E-mount

Sensor

Full-frame Exmor CMOS sensor

Megapixels

24.3-megapixels

Dimensions

126.9 x 95.7 x 59.7mm

Weight

556g (body only)

Price

\$2,149 (body only)



Having in-camera anti-shake allows for handheld shots in low-light.

STEADY AS SHE GOES

Sony A7 II

The A7 was a ground-breaking camera in that it was the first mirrorless system camera to feature a full-frame sensor. A solid camera that proved the concept was feasible, it laid the groundwork for the A7R and later on, the A7S. Its direct successor, the new A7 II has finally been released and Sony again extends the bar by making it the first full-frame mirrorless camera to feature 5-axis in-camera image stabilization. This feature was previously only available in flagship Olympus OM-D series cameras. With its introduction, the A7 II can now use just about any lens, even older manual lenses via adapters and still retain full

image stabilization, which Sony claims an equivalent to 4.5 stops of correction.

The A7 II comes just about a year after the launch of the A7, and while the overall design is largely similar, the new body is slightly wider and taller, and features an improved layout that seems to have taken into account a lot of the grouches with the original design. The buttons on the back of the camera are slightly larger now, making them easier to activate; the shutter button is also larger, and more crucially has been shifted further to the front, making it easier to reach for. Everything is just better spaced, with the dials feeling

more sensibly sized now, making the camera more comfortable to use overall. Even so, it is still one of the most compact full-frame ILCs around.

The menu system hasn't changed though, with the exception of a few added movie options as the A7 II now supports capture up to 1,920 x 1,080 (60p) at a maximum bit-rate of 28Mbps in AVC-HD and XAVC-S.

While it appears that the autofocus system is also largely the same – with the same layout that has 117 phase detection points and 25 contrast detection points – Sony claims that the A7 II has improved autofocus algorithms resulting in up to





We'd easily go up to ISO 12,800 with this camera.

CONCLUSION

Image stabilization not that big of an upgrade to the already excellent A7, but thoughtful tweaks make the A7 II a joy to use.

30% faster AF performance compared to the original A7. Our own testing shows this to be a pretty accurate estimation, and certainly puts it on par with some of the other relatively newer DSLRs like the Nikon D750.

More options for customization is something Sony has made an effort to implement here, as no less than 56 functions can be assigned to a total of ten programmable buttons, making it easier for you to set the camera up just the way you want it.

The overall experience of shooting with the A7 II doesn't change from the original – stick to shorter lenses and you'll be perfectly comfortable. Using longer telephoto lenses still feels a little unbalanced, but we do think it's a lot better with the new handgrip – the added girth of the new body design gives you more to hold on to than before, and that really makes quite the difference. Another thing we found was that the EVF can be a little

too dark at times, but that's an easy fix – just go into the menus and set brightness manually according to the environment.

As might be expected, the images from the A7 II do not vary too much from the original, though we do find that it handles noise slightly better. We'd readily print images at ISO 12,800 with this camera after a bit of sharpening in post, but we do find that the white is notably less neutral.

We hardly found ourselves needing to go slower than 1/60s outdoors. Even indoors in our labs, we managed perfectly sharp images handheld at a manageable 1/13s, at about the 35mm setting. The 5-axis IS doesn't seem to be a major factor unless you're really unsteady or use a lot of manual lenses.

In terms of effective resolution, the A7 II doesn't change much from the original, which is to say there's all the detail you would expect from a 24-megapixel camera. The

bigger difference comes at the higher ISO settings, where the improved algorithms of the new model handle the color noise slightly better. Images are noticeably biased towards warm tones though, so you'll get nice rosy tones outdoors, but a bit too much warmth under tungsten lighting.

Is the difference enough to justify an upgrade if you already have any of the A7 series? Probably not. But if you're in the market for a full-frame camera or shoot in low light a lot, we'd definitely recommend you take a look at the A7 II.

by *Marcus Wong*

TESTED & RATED

8.5_{/10}

HWM
SINGAPORE



AT A GLANCE

Network

Bluetooth, DLNA, Wi-Fi, Ethernet

Dimensions

370 x 232 x 110mm

Weight

4.1kg

Power Output

70W

Price

\$599



Instead of buttons, the H7's rotary dial is a nice alternative allowing for easy volume adjustment.

LET THE GOOD TUNES FLOW

LG Music Flow H7

LG Electronics has joined the wireless multi-room streaming fray with their Music Flow series of speakers that boast support for high-resolution audio. The series comprises three speakers of varying sizes (the H3, H5 and H7), a sound bar and subwoofer combination (the HS6), and the R1 Smart Hi-Fi Audio Wireless Multi-room bridge which plugs into your router and improves the connection between Music Flow units.

The Music Flow H7 is the largest of the three single unit speakers, and features a 2.0 channel amplifier that produces up to 70W of power. Safe to say, it will easily fill a room with sound. The inclusion of LG's own Hi-Fi DAC allows

for audio playback in up to 24bit/192kHz audio, and there's support for most lossless formats, so you shouldn't have to convert your existing tracks.

Dual band Wi-Fi ensures that regular connection is already fast and reliable, and as with the Sonos Play system, having more Music Flow units in your home will mean a better-connected system. The use of mesh network technology means every Music Flow unit connects to the next, forming their own little network.

There's Bluetooth and NFC for quick and easy pairing, and LG has taken the NFC concept a little further by adding the ability for you to "bring" your song with you. LG calls this Tag On.

Basically, you can tap your smartphone on a speaker to get a song playing, then walk into a different room and tap your smartphone on another speaker to pick up from where the last speaker left off without having to go through the app again.

Getting the Music Flow H7 set up was relatively straightforward – the app is well laid out, and the onscreen instructions are easy enough to follow. Just set the speaker into pairing mode, choose to connect to it wirelessly or by running a LAN cable from the speaker to your router. The one caveat though, is that at least one unit must have a wired connection to your router for multi-room audio to work so that limits placement options



Step-by-step instructions from the mobile app guide you through set-up with ease.

CONCLUSION

A good multi-room speaker system that needs further refinement on the software side.

somewhat at least for that one speaker.

We have a bit of a love-hate affair with the Music Flow app. On the one hand, the layout is nice and simple. It also boasts some nice features like “mood playlists”, “favorites” and stores a timeline of the songs you played last. On the other hand though, it’s not the most stable to use as we found ourselves having to reconnect to the Music Flow H7 multiple times over the testing period – the app repeatedly forgot the speaker for some reason.

Music playback can be more than a little confusing, as tapping on a track starts the song playing, but there is a little bit of lag before the music starts and the icon below changes to a “play” sign with the title of the track.

Tapping that gets you a larger view with the album artwork and the playback controls (play, forward and back). Scrubbing a track is almost impossible because

of how thin the bar that indicates play progress is, and in place of a typical stop button, you have a small cross in the upper left corner to stop playback. Adding tracks to a playlist is simple enough, but finding the playlist after that isn’t quite as intuitive. It’s not directly listed out under the Music menu, but rather with the Timeline, Favorites and Mood options under the Home section.

However, these are just some small things that mar an otherwise highly competent speaker system, because the audio on the Music Flow H7 quite easily matches that of other wireless multi-room speakers we’ve tested, and is obviously very capable of playing at high volumes without distortion. We found that the Music Flow H7 performed best with live recordings and acoustic pieces, as it excels in the upper registers, and seems to do a great job of

picking out the energy of live crowds while keeping it separate from the main music.

Tracks like the unplugged version of Hotel California and an orchestral performance of Johann Bach’s Prelude from Partita no. 3 are a joy to listen to, but pieces with synth beats or electronic music don’t do as well – on some of our test staples like Tiesto’s Elements of Life, the speaker fell a little short as there wasn’t neither the soundstage or attack that we’ve come to expect.

by *Marcus Wong*

TESTED & RATED

8.0_{/10}

HWM
SINGAPORE





MISSION: SELFIE

HTC Desire Eye

AT A GLANCE

OS

Android 4.4.4 KitKat with HTC Sense 6

Display

5.2-inch / 1,920 x 1,080 pixels / Super LCD 3

Processor

Qualcomm Snapdragon 801 quad-core 2.3GHz

Storage

16GB internal storage
microSD expansion up to 128GB

Price

\$728

HTC has been experimenting with mobile photography quite a bit recently. Last year's One (M8) was touted as the world's first smartphone with a secondary camera to capture depth information. HTC called this the Duo Camera. Later in the year, they ditched their UltraPixel sensor for a 13-megapixel camera in Butterfly 2 while retaining the Duo Camera setup for much greater image quality. Their latest experiment, the Desire Eye features two 13-megapixel cameras—front and back—to cater to the selfie generation.

As more of a fun, lifestyle device, the Desire Eye is made entirely of plastic,

which may look like a budget phone at first glance. However, its matte texture offers a good grip and like the Butterfly 2, is dust- and water-resistant with the same open port design so you don't have to fumble with flaps. With an IP57 rating, it should survive being submerged up to 1 meter for up to 30 minutes, but HTC doesn't recommend actually using the phone underwater as it is not designed for such use.

The Desire Eye comes at a rather unconventional screen size at 5.2-inches (previous HTC models from the One (M8) to the Butterfly 2 had 5-inch screens) with a full HD 1080p resolution. This means slightly lower pixel density

though it's hardly noticeable. We must say that it's very bright though, even when set to minimum level.

Unlike the front-facing grill-like speakers on the One (M8), the Desire Eye has slimmer and more recessed BoomSound speakers on the top and bottom of the display. It does the job significantly well with loud and crisp audio, but do take note that dust particles will begin to collect at the gaps along the display.

Software-wise, the Desire Eye is loaded with Android 4.4.4 KitKat and Sense 6. While HTC has committed to delivering Android 5.0 updates to the One (M8) and One (M7), there no official



Not only does the front-facing camera boast a 13-megapixel sensor, it also has its own dedicated dual-LED flash.



As a water-resistant phone, the Desire Eye is mostly sealed so access to the nano SIM and microSD slots require some effort.

CONCLUSION

Sturdy and waterproof with great handling; an all-round device that'll also take high-quality selfies.

word of the Desire Eye (or other HTC devices outside of the flagship One family) will get the same treatment.

So what's really new with the Desire Eye? Besides the obvious bump in megapixel count for the front-facing camera, it is the first product to ship with HTC's Eye Experience app, which consist of various camera functional. The app isn't exclusive to the Desire Eye too, and will be made available to other phones in the HTC family in the coming months, though not all features may be supported on every phone.

Tackling the more obvious functions first, the Desire Eye now has many automatic functions for taking selfies, such as smile detection, face tracking and auto selfies. You can also begin a countdown timer through voice activation by saying "Capture" or "Cheese", or shoot a video selfie with "Action". All these functions worked well and

were pleasant to use.

Filters and makeup mode have become a popular function for selfie shots and the Desire Eye offers a Live Makeup mode where you can see and adjust the smoothing effect in real time before you take the shot. There's also Split Capture mode too, where you use both the front and back cameras to take a photo or video at the same time. This feature isn't exactly new as the LG Optimus G Pro and Samsung Galaxy S4 had it prior, but with it is the first phone with 13-megapixel cameras on both ends.

Speaking of which, both cameras aren't exactly the same. The rear camera features an f/2.0, 28mm wide angle lens, while the front camera has an f/2.2 and wider 22mm lens to accommodate for group selfies. Images shot with both cameras also have different processing done. Rear camera shots are more neutral with well-saturated

colors, while the front camera shoots in a warmer tone.

The Desire Eye can also take better selfies in low light with dual-LED flash, which is a better implementation than LG's tactic of using the LCD screen as a source of illumination.

Battery life was pretty decent, and it lasted more than seven and a half hours in our tests. Performance and user experience is similar to previous HTC phones and in a nutshell, seems like a combination of the plastic One (E8) and the ruggedness of the Butterfly 2, with the addition of a better front camera and Eye Experience app for the selfie-focused consumer. Priced at \$728, the HTC Desire Eye finds itself in stiff competition with the recently available Oppo N3 (\$849), which boasts a motorized 16-megapixel camera and an even larger 5.5-inch display.

by *Cookie Monster*



TESTED & RATED

8.5_{/10}

HWM
SINGAPORE



AT A GLANCE

Processor

Intel i7-4710MQ@ 2.5
G02Hz (Turbo Boost up
to 3.5 GHz) with a 6MB
L3 cache

Display

17.3 Inch Full HD Matte
LED display with 72%
Wide Color Gamut
(1,920 x1,080)

Graphics

2x NVIDIA GTX 980M
(8GB DDR5)

Memory

16GB DDR3L

Storage

120GB SAMSUNG EVO
840 + 1TB HITACHI
7200RPM HDD

Price

\$4,204

WITH GREAT POWER, COMES GREAT SIZE

Aftershock Titan V2.1

It's been a while since we reviewed the original Aftershock Titan and the latest iteration, the Titan V2.1, continues to be a monster of a gaming machine.

Unlike the Aorus approach to create an SLI configuration into a slim chassis, the Titan makes no excuses at being a desktop replacement.

Its large size actually affords it a lot of room to pack in high-end hardware without compromising cooling and ventilation. We don't know what deal Aftershock made with the Devil, but the Titan V2.1 is relatively quiet even when its fans are running at full blast during gaming. It's not whisper-quiet obviously,

but compared to its contemporaries that sound like aircraft taking off the moment you fire up a game, the hum of the Titan V2.1 comes across as bearable background noise.

And we're talking about twin GeForce GTX 980Ms here, making the Titan V2.1 one of the most powerful gaming laptops around graphics-wise, even against the Aorus X7 Pro, which comes in an SLI GTX 970M configuration (also reviewed in this issue).

Another benefit of its size is its solid base and a keyboard that's much more comfortable to use due to greater key travel distance. It actually reminded us more

of a regular PC keyboard. The fully customizable backlight option is a plus too.

Another thing we love about the Titan V2.1 is its removable battery, which is a feature that's becoming a rarity these days as manufacturers try to shave weight and bulk by integrating as many components as possible. For something as large as the Titan V2.1, having the option to switch out battery packs makes a lot of sense.

So, let's tackle the real question on your minds. How does Aftershock do it? How can the Titan V2.1 feature twin SLI GTX 980Ms for \$4,204 (based on recommended specs) when



The backlights for the keyboard is easily customizable with any color you can think of.



It may not be as stylish as Aorus X7 Pro but the Titan does have some visual flair.

CONCLUSION

Don't mind the weight or slightly barebones spec, the Titan V2.1 has more than enough graphics power to outmuscle everything.

the MSI GT72 2QE Dominator Pro, which comes with a single GTX 980M, already has a base cost of \$4,208?

Unfortunately, the simple answer is compromise. Pretty much every other component on the Titan V2.1 is a level or so below the competition.

Yes, you can customize the machine and upgrade processor, RAM and maybe get a Blu-ray drive instead. There are also two additional mSATA bays for expanded storage options and RAID configurations. However, all this will significantly add to its cost.

What we find surprising though is the fact that there is no upgrade option for its display, which is limited to a full HD 1080p panel. For a 17-inch notebook with SLI GTX 980Ms, we certainly expected more.

There are a couple of minor quibbles we have about the design as well. We really don't like having USB ports only on the right side

and the back. Considering that most of us are right handed, having a USB device attached (maybe a thumbdrive or even a wired for USB device) on the right side can only lead to accidental collisions with the mouse. Since this is a gaming laptop, do you really want to be interrupted in the midst of gaming just because you bumped into your thumbdrive?

When it comes to actual performance, the Titan V2.1 takes no prisoners. It consistently outperforms all its contemporary peers. We benchmarked it against the MSI GT72 2QE Dominator Pro (single GTX 980M) and Aorus X7 Pro (SLI GTX 970M). Although on paper, the Titan V2.1 does have a weaker processor and less RAM than the competition, its raw graphics performance makes up for everything. The Titan V2.1 was actually able to double the scores of the MSI GT72 2QE Dominator

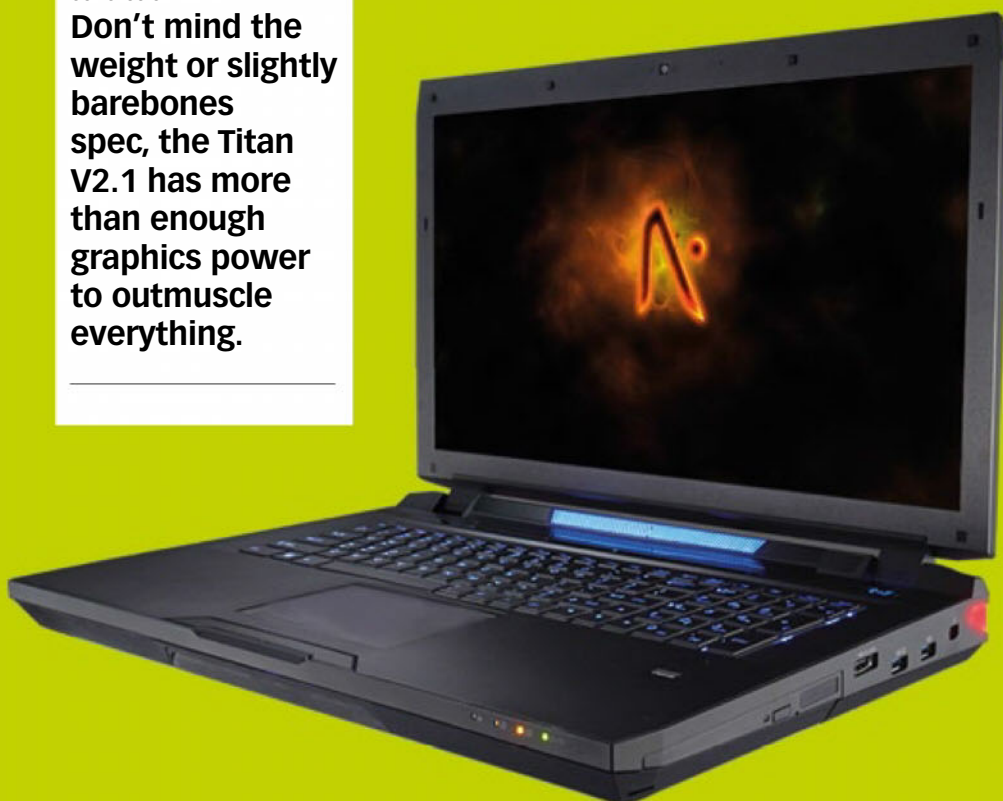
Pro in both 3D Mark 2013 Fire Strike benchmark and Tomb Raider in High settings. Results against the Aorus X7 Pro was also impressive, with an average 20% performance lead.

It is also notable that we recorded lower temperatures on the Titan V2.1 than both the MSI and Aorus after benchmarking.

At the end, it boils down to function over performance. Other brands like MSI, Aorus and Razer offer additional features and solutions like customizable macros, Killer LAN and upgradable MXM graphics to entice gamers, and to an extent, it does help shape a balance gaming system.

The Titan V2.1 on the other hand, eschews all the frills for pure power. If you want a notebook that'll play just about anything at the highest settings, the Aftershock Titan V2.1's made for you.

by Salehuddin Husin



TESTED & RATED

8.5_{/10}

HWM
SINGAPORE

AT A GLANCE

Processor

i7-4870HQ @ 2.5 GHz
(Turbo Boost up to 3.7
GHz) with a 6MB L3
cache

Display

1,920 x 1,080p Full HD,
anti-glare

Graphics

SLI (2x) NVIDIA GTX
970M (6GB DDR5)

Memory

16GB DDR3L

Price

\$3,999



The 5 shortcut keys located on the left side of the keyboard lets you do a variety of things quickly.

CONCLUSION

The X7 Pro continues Aorus' streak for dishing out monster frame rates while staying super slim.

TESTED & RATED

9.0/10

HWM
SINGAPORE

TWO IS ALWAYS BETTER THAN ONE

Aorus X7 Pro

The third iteration of the Aorus X7 carries pretty much the same chassis design as its predecessors (the X7 and X7 V2); all three models arriving in quick succession within the same year and it shows how manufacturers are chasing specs to maintain up their claims as the top gaming notebook around.

The X7 Pro is one of the few notebooks refreshed with the higher end Intel processors, in this case the i7-4870HQ. This is Intel's second fastest chip after the i7-4980HQ (which is found in the MSI GT72 2QE). It's also unique in that it's running two GeForce 970Ms in SLI mode, which means there's a boatload of power under the hood. Couple that with a 512GB SSD storage and 1TB in conventional HDD and you not only have speed, but capacity as well.

As the design is pretty

much the same as before, so we'll not focus too much on it. The aluminum chassis looks good and feels very durable, but smudges way too easily. Still, it continues to be one of the more impressive designs around considering the hardware Aorus packs into the slim body.

The keyboard uses chiclet-style keys with a row of customizable macro keys to the left. Only the macro keys use special scissor switches for faster response though. If you're a hardcore gamer, you probably won't like the keyboard anyway as its slim design means very shallow keys that do not provide satisfactory feedback, unlike the ones on the Aftershock Titan V2.1 or the ASUS G751.

Similarly, the track pad isn't much to shout about either. While it looks nice and shiny, the entire thing is flushed into the chassis

and it becomes annoying over time how we have to constantly look down just to make sure our fingers are still on the pad. Of course, Aorus is probably counting on gamers to use external keyboards and mice when it comes to gaming, so they went with form over function here.

So, it all comes down to performance. The Aorus X7 Pro is a very impressive gaming laptop, no doubt about it. The SLI'd 970Ms inside make it a force to be reckoned with. The X7 Pro pretty much blew away all the other notebooks in nearly every benchmark we tried. It even broke the 100 FPS barrier for Middle Earth: Shadow of Mordor on High, a feat even the monstrous MSI GT72 2QE Dominator Pro couldn't achieve.

by Salehuddin Husin

THIRD TIME REALLY IS A CHARM

Dragon Age: Inquisition

AT A GLANCE

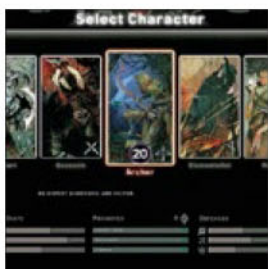
Developer
BioWare

Publisher
EA

Genre
ARPG

Platform
PS4, PS3, Xbox One,
Xbox 360, PC

Players
1-4



There's a token multiplayer mode, but it's boring and matches are hard to find, so skip it.

CONCLUSION

Inquisition is a glowing example of a great role-playing experience with tightly knit storytelling that befits its legacy.

BioWare's return to gaming after the Mass Effect 3 debacle heralds a return to form for both the company and the Dragon Age series. It's pretty impressive to see the massive retooling BioWare has done here, pulling the series from the pit that consumed the second instalment.

Inquisition has an epic story that weaves past Dragon Age games and cast expertly into the narrative. If you've stuck by the series from the beginning, here's where it all pays off. Of course, that's a double edged sword. In catering to the faithful, BioWare has alienated newcomers. They've done an admirable job to ease newbies into the world of Dragon Age but with so much backstory and material to cover, it was never going to be enough.

Fusing both real time and turn based systems might seem like a bad idea, but it works superbly well here. Combat's unforgiving this

time around, especially on higher difficulties and is a tad unbalanced but is fun enough that it never becomes overwhelming. That is unless you play a Knight Enchanter, then you're unbeatable.

The biggest flaw in Inquisition is inventory management. It's archaic, stupid and the interface makes everything a chore. If you have to spend time figuring out whether a new equipment piece is better or not, that's a bad thing. Worse still, there's not even a sort option to reorganize your items. Whoever did the UI for the inventory systems should be shot.

Of course, what's a BioWare game without glitches? Inquisition suffers from its fair share of bugs. Be it conversations that don't trigger, freezing issues and even corrupted saves, Inquisition has it. To BioWare's credit, the game's been patched numerous times since release and most (if not all) of the game breaking bugs

have been squashed, but if you're playing on a console with no internet connection, the experience might not be as pleasant as you'd expect.

In fact, Inquisition pretty much requires an internet connection (though it's not mandatory). With internet access, you can connect to Dragon Age Keep, a service that lets you manually create a backstory of the world based on past games to your liking. It might feel like a cheap hack since there is no compatibility to import from past games, but most importantly it works.

by Salehuddin Husin

TESTED & RATED

8.5/10

HWM
SINGAPORE



AT A GLANCE

Developer
Level 5

Publisher
Nintendo

Genre
ARPG

Platform
3DS

Players
1-3



The game looks like a mash between the Legend of Zelda and Animal Crossing, plays like it too!

CONCLUSION

A decent distraction and time filler between the triple AAA titles you're really waiting for.

A LIFE YOU MIGHT WANT TO LIVE

Fantasy Life

The 3DS may just cement itself as the go to system for RPGs. With the Shin Megami Tensei games and other notable RPG series only available on the portable console, it's slowly building up an RPG library worth playing, the latest being Fantasy Life.

Fantasy Life is your standard medieval fantasy RPG, but with a twist. It has more in common with MMOs than normal RPGs. While you do have a story to play through, the meat of the game is open ended.

In Fantasy Life, you choose a Life (essentially a class) and you're off. These range from martial ones like a Paladin or Mercenary, to trade ones like Blacksmith or Carpenter. Each Life is varied enough that it is encouraged to try all of them, though some are more interesting than others. You can even use abilities earned in one to complement those from others. Here's where the

initially simple system grow more complex.

The hook of the game is its simplistic nature and a personal drive to level up all the classes. As your gear and weapons are visually distinct, it's a major driving force to keep playing to see what new cool stuff you can unlock as you progress. Street Pass functionality encourages this; as other players can view your characters. Don't you want everybody you meet to see what a unique snowflake you are?

Despite that, combat (both online and off) is a rather repetitive process. It has very little depth, no matter what class you're using. Sure, you may need to time your button presses or be at a certain range to get the most out of your Life, but that's the extent of it.

Likewise, the story too is lackluster and stereotypical. It's linear, with the plot pretty much evident from

the get go and twists you can see a mile away. While it does have some nice character designs (I'm partial to the Al Maajik by Yoshitaka Amano (famous for his work on Final Fantasy), the rest of the game falls squarely into the stereotypical anime category.

In the barren months ahead, Fantasy Life might make a worthwhile diversion. But unless you're totally invested in the grinding and leveling, expect to jump to the next big thing as soon as they go on sale.

by Salehuddin Husin

TESTED & RATED

7.5_{/10}

HWM
SINGAPORE



FEATURE

BEHIND THE SCENES AT NIKON AYUTTHAYA

It's not every day you get an opportunity to view first-hand how a DSLR camera is assembled, so when the opportunity arose to travel down to Nikon's facilities in Ayutthaya, Thailand, we certainly jumped at the chance. You may recall that this is the same factory that was hit by severe flooding back in 2011, so that certainly provided an additional level of interest – just how well had Nikon recovered from that disaster in just three years?

Text by *Marcus Wong*

AN EXERCISE IN PRECISION

A quick introductory briefing, and we were ushered to a clean room where we had to don a factory smock, hairnet, and face mask before being led to the production floor. Maintaining the sterility and cleanliness of the production line is utmost priority, evidenced by the steps taken before you even step into the assembly area – industrial-strength air blowers blast debris off your suit, and wet pads you walk on clear any sediment on your shoes before you enter.

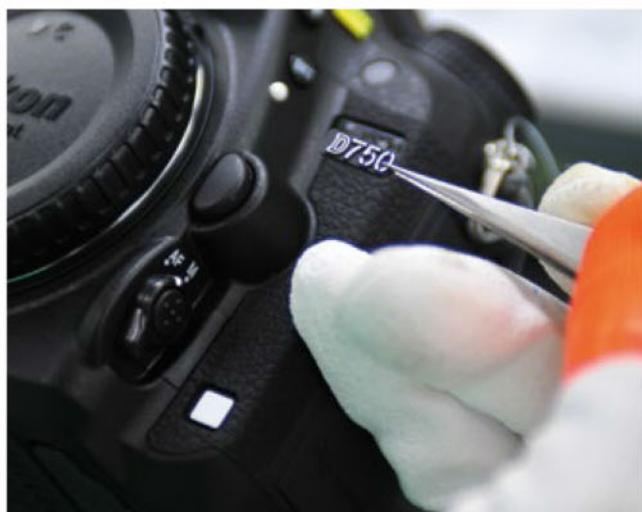
The first thing that hits you when you're on the factory floor is how many rows of production there are. Each camera runs through about 10-12 steps of assembly, cleaning and monitoring both by hand and by machine. While the main components such as the front body unit, pentaprism and sensor reach the line ready for assembly, it's not quite as simple as fitting all the pieces together and screwing the body shut.

Rather, every unit has to be precisely aligned, and even the amount of torque applied to the screws for particular units is digitally measured for absolute precision. Different units were put through different means of testing – for example, the main mirrors are checked and tested for flaws using an electronic microscope, while the main CMOS sensor is checked for alignment by placing the entire body into a machine that uses sensors to measure the sensor's exact position before being mounted.

After every camera body is fully assembled, a worker mounts a lens on the camera to test the basic functions like the various drive modes, and physically checks to ensure that everything is fit together well. After that, a computerized system checks the sensor's resolution, the flash sync speed, and the focusing ability in movie mode, while the flash is fired off several times to ensure that it's working properly.

Full assembly for a single camera takes about 100 minutes, and on a monthly basis, the Ayutthaya factory alone produces on average 500,000 units of DSLR and Nikkor lenses, with a max production of 700,000 units per month – impressive numbers when you consider the rounds of testing and evaluation each camera goes through.

The factory operates 24 hours a day, split between two teams, but to ensure that the workers stay fresh, Nikon has enforced a fifteen minute break every two hours. Perhaps because of the precision necessary for the assembly, a majority of the workers are female,



and while Nikon states this certainly isn't by design, they have noted that females have proven to be both adept and nimble in handiwork, which contributes to the meticulousness needed for the assembly process.

Apparently, all new employees at the factory are trained with the basic skills to start, then moved on to specialized training for the particular stage of assembly at which they'll be posted to. This specialized training takes two weeks, and occurs before the employee begins official duties. Additional training is conducted as necessary, and all employees get bi-annual training to further their abilities.

What's interesting to note is that while Nikon Thailand initially started with DX-format DSLRs, the quick improvement in skill level of the staff saw them progressively move to managing the production of selected FX-format DSLRs. Now, a large portion of Nikon's DSLRs are produced in Thailand, with just the "high-end" and "special" category models produced in Japan.

The production plan is managed by Nikon headquarters (Japan) on a bi-weekly basis based on consolidation of market information, allowing them to match demand appropriately. While all the research and development is done in Japan, the key engineers from Thailand are sent up to Japan when new models are introduced, so that they can share whatever new techniques have been developed upon their return.



"While the main components such as the front body unit, pentaprism and sensor reach the line ready for assembly, it's not quite as simple as fitting all the pieces together and screwing the body shut."



Recovery from disaster

Nikon says that during the flooding in 2011, the water level around the factory went up to 2.8m deep, and stayed at that level for about 14 days. This necessitated the use of joint efforts with Thailand's army to fly staff in by helicopter, allowing them to recover important equipment before they were damaged beyond repair.

They started pumping water out of the factory in early November, and it took about a month to have the factory clear, by which time most of the damage had already been done. Production was moved to Japan in the meantime, with some 300 to 400 staff flown over to Nikon's facilities there. Measures have since been taken to prevent a reoccurrence, like a new flood wall created some 800m away to protect the factory from water damage, and a new satellite factory built north of Ayutthaya on higher ground.

Knowing all that, and looking at some of the photographs shared, we must say it's incredibly impressive that the factory has recovered as well as it has – there are virtually no signs of water damage anywhere! **HMM**



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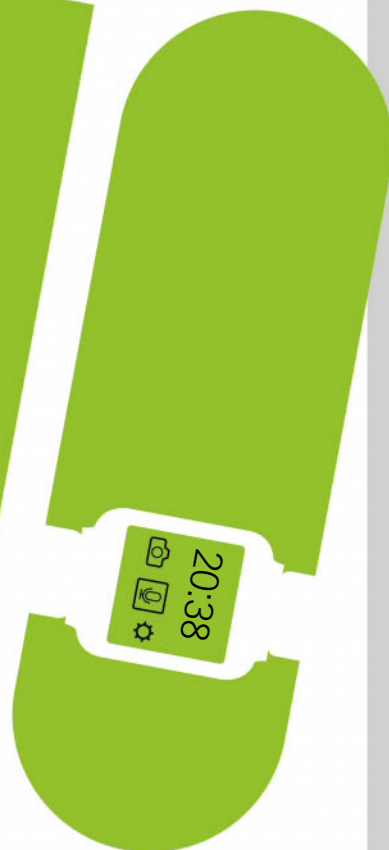
ANDROID WEAR

Android Wear is Google's version of Android for smartwatches and other wearables. The OS has been designed to work on a small scale, with voice commands and minimal touch input as your main navigation points. If you've just bought your first Android Wear device, or you just want to get more out of your existing wearable, here's everything you'll need to know to get the most out of Android Wear.

Text by *James Lu*
Art Direction by *Ian Chong*

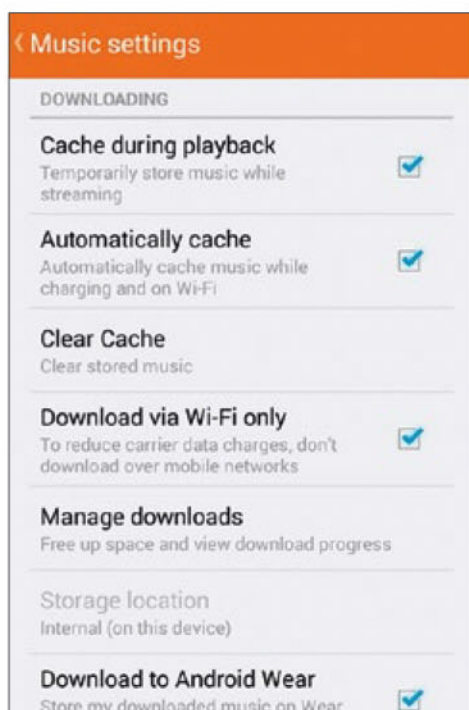
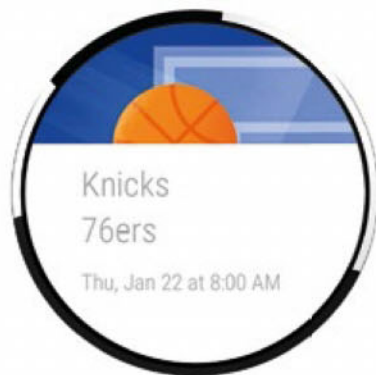
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- ADOBE CREATIVE CLOUD LIBRARIES MADE EASY
- BROWSE THE WEB DIFFERENTLY ON YOUR IPHONE OR IPAD
- SYNCING AUDIO FOR DSLR VIDEO RECORDING



CHANGE YOUR WATCH FACE

There are two ways you can select a different watch face. The easiest way is to just hold down on the current watch face, then scroll through the options. If you don't see anything you like, your most recently used watch faces will be found all the way to the left. Alternatively, you can go to the settings menu by tapping the clock, then scrolling all the way to the bottom, then scrolling down again to "Change Watch Face."



LISTEN TO MUSIC OFFLINE (EVEN WHEN YOUR PHONE ISN'T IN RANGE)

The latest Android Wear update enabled offline music playback via Google's Play Music app - that means you can store audio tracks on your watch and listen to them even when your phone is out of range.

Start by opening Play Music on your phone, then head to the Settings screen and scroll down to the Download to Android Wear option - enable this to start syncing songs over to your smartwatch. Songs, albums and playlists can be marked for offline listening, just note that most smartwatches don't have a huge amount of storage space, so you'll have to be selective with what you transfer.

Once you've synced your music, go to the Play Music app on your watch. You'll see a list of songs you've synced. You can swipe down to display different playlists, or swipe left on the chosen playlist to start playing it on shuffle. Swipe left again and you'll get to the track listing, which will let you pick a specific track to play.

Note that very few smartwatches have their own speakers, so you'll have to pair a set of Bluetooth headphones with your watch to listen to music.

GET FAMILIAR WITH NOW NOTIFICATION CARDS

Now Cards are notification cards similar to Google Now that pop up from the bottom of your screen. These include text messages, emails and missed phone calls, as well as traffic and weather updates. As of update 4.4.W.2 you can opt to have these notification cards remain on your screen until swiped away (just swipe down to dismiss them), or to only pop up for a few seconds before disappearing. Toggle between the two settings by going to the Settings menu and selecting the "Card Preview" option. Opting for "Watch face sets card preview" will allow notifications to remain on the display, while selecting "None" will not. Whichever you select you can see your unread notifications by swiping up from the bottom of the display.

To scroll through your notifications, keep swiping up. If you want to see more info on a card, just tap it. Some cards will display extra options when you tap them, for example, a Gmail card has options that let you archive, reply, or open Gmail on your phone. When you're done with a card dismiss it by swiping from left to right. Dismissing a card on your watch will dismiss the same notification on your phone and vice versa.

If you accidentally dismiss a card and want to retrieve it you can do so by immediately swiping down from the top of your watch's display and pressing the 'Dismissing' button with the reverse arrow on it. You have about five seconds (there's a little timer surrounding the button that shows you how much time you have left) before the notification is gone forever.





CHOOSE FROM A LIST OF THINGS YOUR SMARTWATCH CAN DO

If you're in a public space and you don't want to talk to your watch, you can bring up a list of things it can do. Just wake the screen up, then touch anywhere on the screen. You'll see a white screen with a red 'g' on it. Below the g is a list of things your watch can do, such as "show me my steps", "show me my heart rate", and "set a timer."

You can also open any installed apps from this screen, just scroll all the way to the bottom and select the "Start" option. This will display your list of installed apps. To install more apps, open Android Wear on your phone, scroll to the bottom of the screen and select the "Browse suggested apps" option. Anything you choose to install here will automatically sync to your watch.











CHANGE YOUR WATCH MODE BASED ON YOUR ENVIRONMENT

If you've updated to Android 5.0 Lollipop on your smartphone, your Android Wear device will have been updated with two specialized modes: Theater, which deactivates the screen and turns vibrations off, and Sunlight, which momentarily boosts screen brightness, for when you're trying to read the display outdoors. Swipe down on the watch face then swipe to the right to find these modes. Sunlight mode automatically deactivates itself after a few seconds, but Theater mode has to be toggled off manually: just double tap the screen, or if your watch has a physical button on the side, just press that to get back to normal.



GET USED TO SPEAKING TO YOUR WATCH

While a few wearables boast 2-inch screens, most smartwatch screens are much smaller. It can be tricky to input commands or even navigate the menu with your finger on such a small screen, so your main point of interaction should be with your voice. Start by waking the screen up by touching the screen, bringing the watch up to your face, or by pressing a button on the watch (if it has one), then saying "Okay Google..." You can follow up with almost any query or command you can think of, such as "set an alarm for 6PM today" or "what is 15 percent of 32?" or "what's the weather like today?"

Block app	
	Connect
	Gmail
	Hangouts
	Fit
	Android System WebView
	Android Work Assistant
	Basic Daydreams
	Bluetooth Share

SELECT WHICH NOTIFICATIONS GET PUSHED THROUGH TO YOUR WATCH

If you don't want to be spammed by non-stop notifications on your watch, you can choose which notifications go through and which stay on your phone. Do this by going to the Android Wear app on your phone and opening the "Mute app notifications" option. You can then select which apps you want to blacklist, preventing them from forwarding notifications to your watch.

ADOBE CREATIVE CLOUD LIBRARIES MADE EASY

by Jimmy Tang



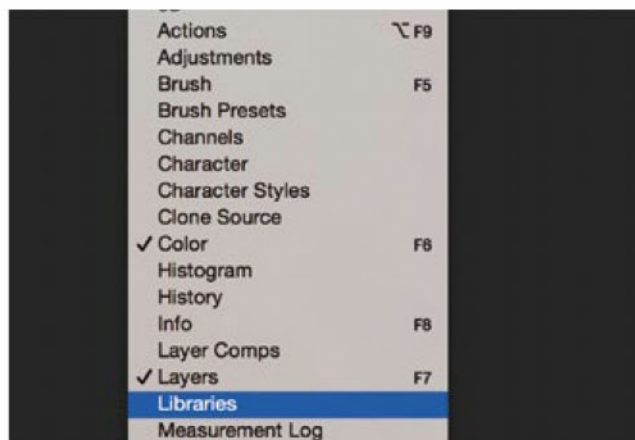
Have you ever experienced the frustration of searching through your files for commonly used creative assets, or having to open multiple files in different applications to get the common design elements you need for your project? Or when you're done with your project, only to realize that you've ended up with outdated creative elements?

All of that will be behind you with Adobe's latest update to its Creative Cloud suite of software. If you're a subscriber to Adobe CC,

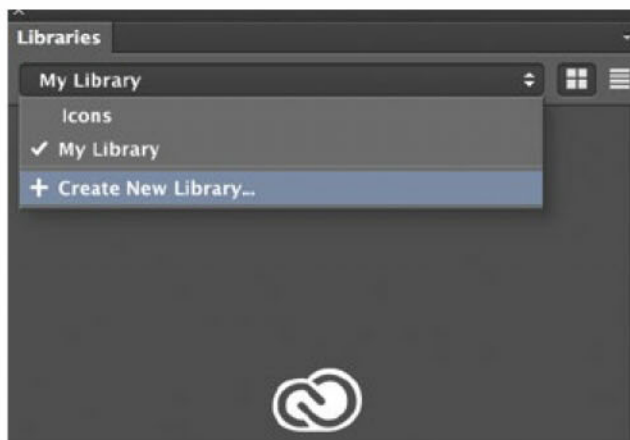
the October updates would have enhanced your favorite applications with the library feature which helps you manage your creative assets and help you streamline your project workflow. It's built to help designers manage and access their favorite colors, color themes, brushes, type styles, and raster and vector graphics through Creative Cloud.

Let's run through some of the basics of Adobe's new Creative Cloud Libraries in Adobe Photoshop CC 2014.

1) Open the Libraries panel by going to the Window menu and choosing the Libraries option.

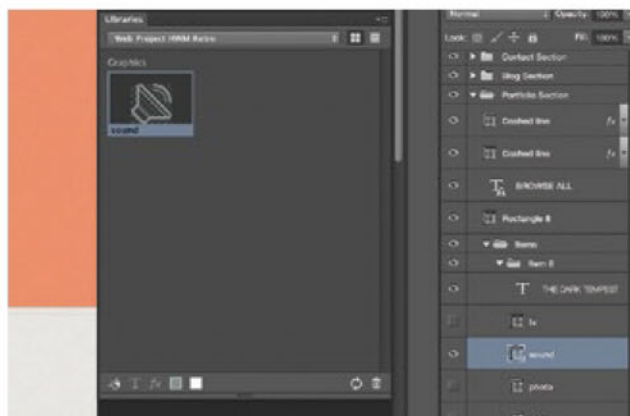
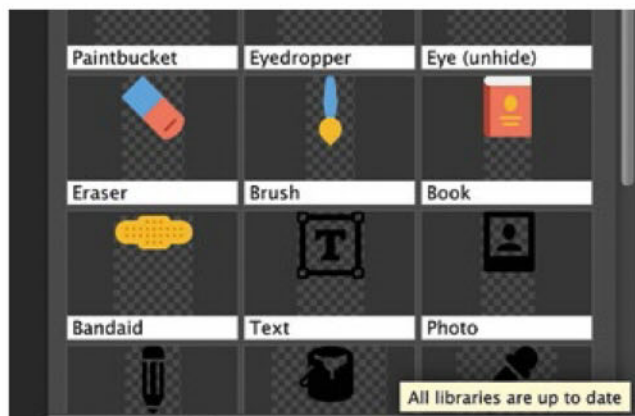


2) Create a new library for your project by selecting Create New Library from the dropdown menu. Give it a descriptive name so that it's easily identified once it's synced into your Creative Cloud.

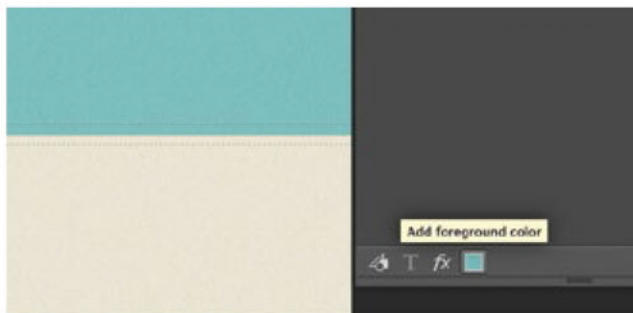


3) The icon on the bottom right of the panel will tell you if your assets are synced into Creative Cloud. Once they are in the cloud, you can access them in other applications like Illustrator and Adobe's mobile apps.

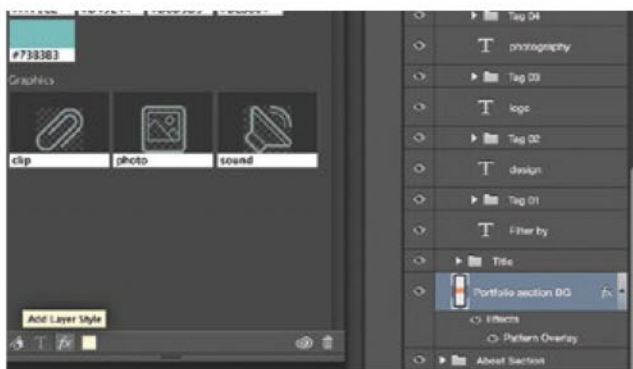
4) To add assets into project library, select the object from the layer's panel. Once you've selected the right layer, press the V key to use the move tool to drag the object and drop directly into the libraries panel. The asset will then be synced automatically into the Creative Cloud and appropriately labeled as a graphics object. If you don't want to drag and drop, you can also click the Add Graphic icon on the lower left corner of the Libraries panel.



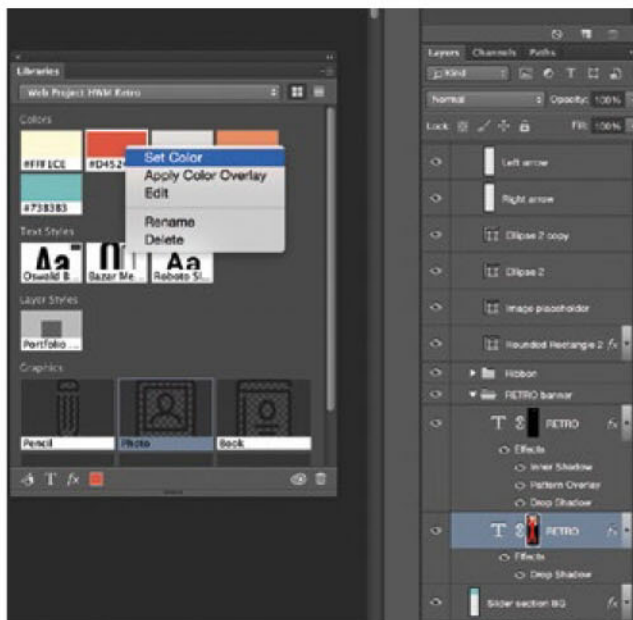
5) To add color, find and select the object from the layer panel. Once it's highlighted in the layer's panel, you can click the add color button in the Libraries panel to add it into the project library. You can see that it's added and labeled as colors. All other colors added from now on will be grouped under colors, so it'll make accessing your project's color palette a whole lot easier.



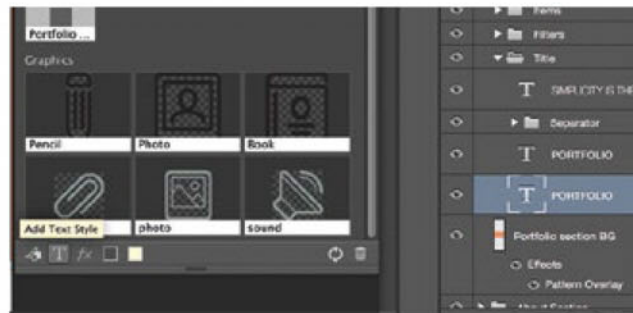
7) Similarly, a layer style can be added to the library. You can do this by simply selecting a layer that contains a layer style and then clicking the Add Layer Style button in the Libraries window.



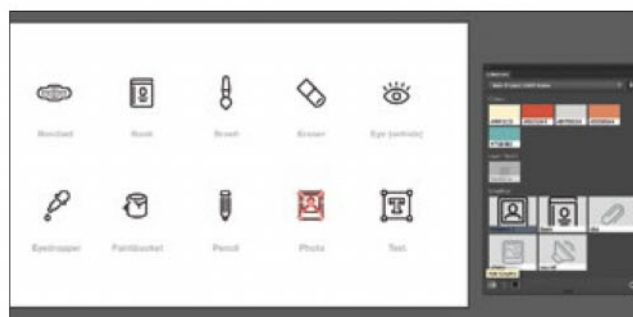
9) The process to apply the creative assets you've collected in your library into your project is very much the same. If you're applying a text style into your project, select the appropriate text object in your layer panel and subsequently click the text style in your libraries panel. The same goes with color and layer styles.



6) You can also add type styles by choosing a type layer in the layer panel and clicking the Add Text Style button and it will be added to the library.



8) You'll notice by now that all these creative assets are stored in the cloud that can also be accessed in other applications. Similarly, you can add other assets to the project library from other applications like Illustrator and Adobe mobile apps too.



The Creative Cloud libraries panel is also available in other applications like Adobe Illustrator CC 2014.

10) An image object saved into your project library from Illustrator can also be dropped into your Photoshop project simply by dragging and dropping it from the libraries panel. If it's a vector art, it will be automatically converted into the right format in Photoshop.



The vector graphics extracted earlier in Step 8 from Adobe Illustrator can be easily dragged into the Photoshop workspace from the Libraries panel.

As you can see from this simple exercise, Creative Cloud Libraries let you access and gather your creative assets in a single location, accessible anytime on any computer through selected applications, as long as you're connected to the internet. When your assets are always within your control, maintaining an updated and consistent set of assets for any of your creative projects will help you streamline your workflow while making it easier to focus on your designs.

BASIC ANIMATION WITH MAYA 2015

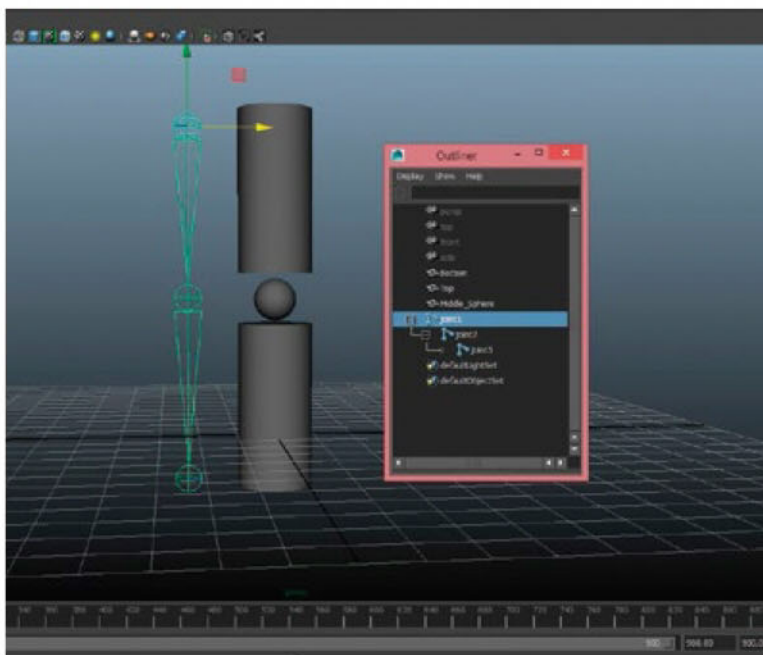
by Salehuddin Husin

Welcome back! Here's the final part of our basic Maya tutorial, animating your creations. Hopefully, you'd already have your models all ready for this part. Animation is tricky but once you get the hang of it, is extremely easy and fun.



1) First, we're going to be breaking down the basics. See the row of numbers at the bottom of the screen? That's your Time Slider. It shows where you are in your animation, as well as how long your animation is. Typically 24 frames is one second, although you can change this setting by going to Window > Settings/Preferences > Preferences > Settings > Working Units. For now, we stick with 24 FPS, with a total frame count of 120 frames, for 5 seconds of running time.

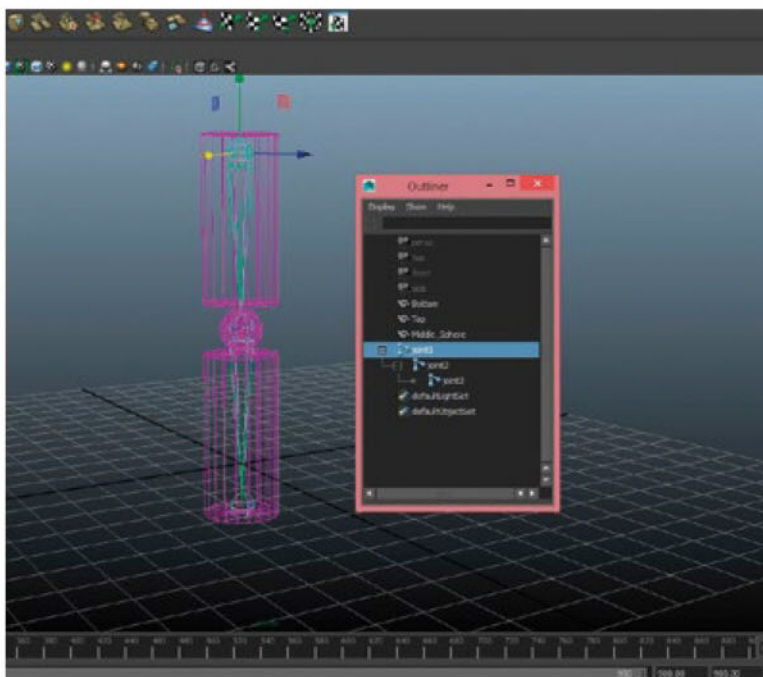
Make sure the Outliner window (Window > Outliner) is open. Enter Four View (hit Spacebar) and you'll get to four separate views of your scene. Find the one that looks Front or Side (either's fine). Now make sure the Menu Set's (upper left) set to Animation. This will make the Skeleton menu (upper middle) appear. Click it and select the small box near Joint Tool. The cursor will change into a crosshair and the Joint Settings menu will pop up. Using the Front or Side view, click the top of your model, the attaching joint and then the other models. In our case, we'll click the top of the first cylinder, the sphere and then the bottom of the other cylinder, for three joints. Depending on your model, you might want to have more.



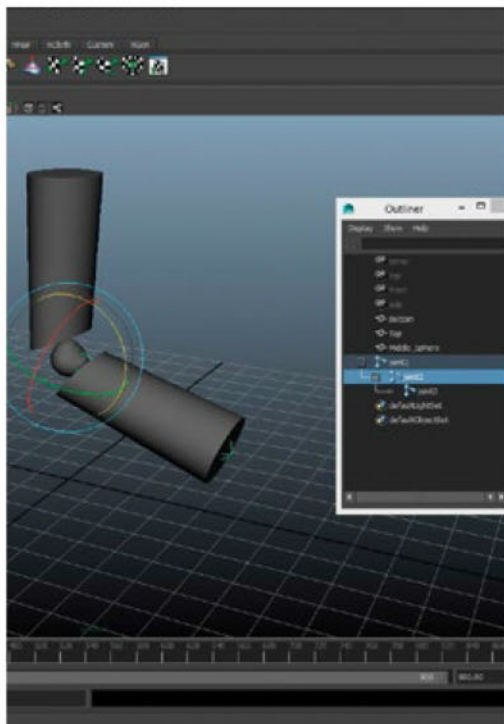
2) Now go back to Perspective view (hover the mouse over the view in Four View and hit Spacebar) and make sure that the joints are INSIDE your models.

Here's the tricky part. In the Outliner, click on the first joint (Joint1 in our case) and then CTRL click with your first model (Top for us). Those two selected (and ONLY them), click on Skin (top menu) and then Smooth Bind. That'll bind the joint to the models. Now repeat with Joint2 to your second model and so on.

Once done, go back to the Outliner and select a joint. Since we have three, we're using Joint2 since it offers the most dramatic effect. With joints bound to the models, moving one will move them all.



3) Now that you can move the models using the joints, it's time for the animation. Set the time slider ranges to 120 (the two boxes at the 'No Anim Layer' box) and then click on 0 in the time slider itself. That'll take you to Frame 0, the beginning. Select the joint you want to animate and hit 'S'. S is the shortcut to keyframe a frame, meaning the frame saves the position of every object in that frame. Move to Frame 24, move your joint to a desired direction and then hit S again.



Congratulations, you've just made your first animation. With 24 frames done, you can move the Time Slider back and forth to view the animation. Just remember to hit S every time you want to keyframe an animation and you'll be set.

Animating with joints is the same, albeit much easier. Simply select the object you want, hit S at the frame you want and then move the object to anywhere you want, to any frame you want. Hit S and you're done. If you have knowledge in Flash animation, keyframing should be very familiar and intuitive to you.

Finally, once you have all the animating done, it's time to render. Hit Render Settings then Common. Under Image format, choose JPEG. Take note of the render directory then change the Menu Set (upper left) to Rendering. Pick Render from the top menu and then Batch Render. That's it! Alternatively, if you don't want jpegs, you can render as avi format, though that only works if you're using Maya Software to render instead of mental ray. Using that is easier but the trade-off is that all your texturing work and other fancy effects won't be rendered, just the basic polygons.

Assuming you rendered as jpegs, you now need to link those jpegs files into an avi using a program called VirtuaDub (or similar). Just load your images and then export as a video. Enjoy your animation video and use it to impress your friends and family.

BROWSE THE WEB DIFFERENTLY ON YOUR IPAD

by Zachary Chan

The way we use a mobile device is different from a desktop computer. Take software for example. On computers, you generally know exactly what you need. Smartphones introduced the concept of the app store, which is more of an exploratory experience. Similarly, the way you browse the internet can be different. Most websites default to simplified versions when they detect a mobile device. And even if you force the desktop version to load, you'll often run into navigation and layout issues. If you're looking for an alternative approach on your iOS device, you could try Opera Coast, which has recently had a major upgrade to version 4.0. Here are four reasons why you should give Opera Coast 4.0 a try.

1. Opera Coast is designed for touch-based navigation. Yes, you can bring out the search bar if you want to specifically visit a page. However, like the App Store, results are visual rather than just plain text. Also, in Opera Coast 4.0, there is a new Discover feature where you'll get curated content pushed to you when you bring up the search bar. When you're on-the-go and don't really have time to sit down and digest your daily bookmarks, this is a great feature to hop around with topics that seem interesting. Who knows, you might just find a new favorite site.

2. Most websites have some form of share button, but it's not always apparent, and sometimes they don't have a link to your preferred social network or messaging app. Copy-pasting links from a website on a smartphone can also call for some finger gymnastics. Opera Coast 4.0 has its own built-in share button that allows you to post just about any content to popular messenger and social networking sites like Facebook, Twitter, WhatsApp and Line. Again, it does this in a visual manner so your link looks like a customized image rather than a text URL.

3. Opera Coast 4.0 supports Handoff, which is part of Apple's new Continuity features. This becomes a great way to continue surfing from your iPad to on your Mac once you've reached home (or the office). You can now jump between different browsers, screens and other devices too. While this feature is not limited to Coast, your other devices/browsers will need to support or have Handoff enabled.

4. Lastly, Opera Coast 4.0 finally comes with Opera Turbo compression technology. This feature was previously only available in the Opera Mini version of the browser for iOS. Opera Turbo is a server-side compression technology which routes the pages you're loading to dedicated Opera Turbo servers first, which then try to reduce data sizes as much as possible before sending it to you. This often results in lower bandwidth usage for you and helps load pages faster. While Turbo doesn't work on all content, especially encrypted ones like online banking, it is very useful for general surfing especially if you have a low data cap or in an area with very bad connection speeds.

SYNCING AUDIO FOR VIDEO

by Marcus Wong

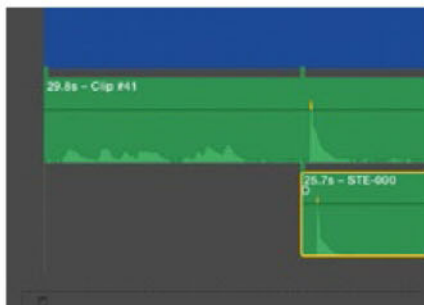
Nothing feels more unnatural than watching video that is out of sync with the audio, but quality audio means incorporating an external audio source. Read on to find out just how to get all your feeds perfectly in sync.

As good as the in-built microphone on your DSLR is, you'll probably want to invest in a separate audio recorder as you progress with your video explorations.

That's because the recorder from your camera is likely to capture everything that's going on when you're recording, which may not be optimal for getting clear dialog from your main subject.

A separate recorder placed near to the speaker allows you to get focused sound for clear audio, but introduces an extra element that you'll have to deal with – syncing the two feeds so the audio matches the video.

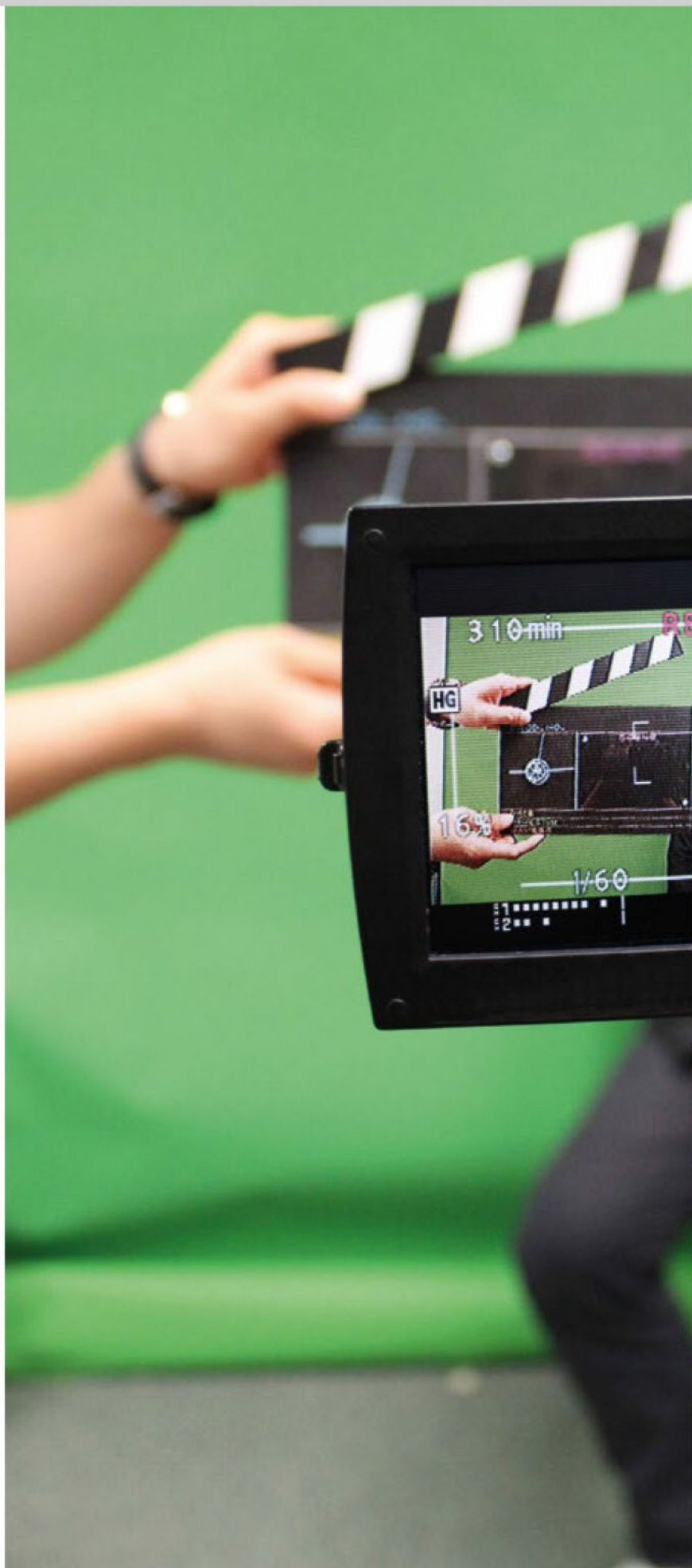
Here are a few quick tips to let you do just that:



MATCH THE WAVEFORMS

You'll probably notice when you drag a video clip into your editing software that there's a corresponding audio track below it. That's the audio from the camera itself, and gives you a guide as to where to place the track.

Remember that loud sound you made at the start of recording? That will show up as a spike in both the audio from your camera and the audio from the recorder. Match the two spikes, and you'll be well in sync!





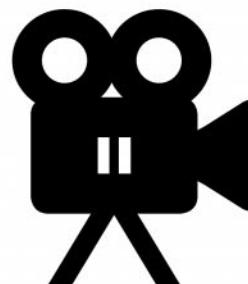
USE A CLAPPER OR SOME OTHER DEVICE TO MAKE A LOUD SOUND JUST AFTER YOU HIT RECORD

This way, the noise is captured by both your camera and the audio device at the exact same time. Do this for every take, and you'll have an easier time matching all the audio back later. (And more so if you're using multiple cameras)



KEEP A TIME LOG OF WHEN RECORDING STARTS AND ENDS

If possible, have someone keep track of all the times you hit "record" and "stop" for the day, and add notes about each take so you know exactly which portion you're looking to use. This is especially handy if you follow the tip above and leave the audio on all the time, as you can just jump forward to the appropriate segment of audio by time.



LET THE AUDIO STAY ROLLING AND ONLY PAUSE THE CAMERA

While video files are large, the size of audio is much more manageable and so you can probably afford to leave your audio devices running the entire time. This helps as you don't have to worry about trying to simultaneously start both video and audio capture, and later you can just play back the audio to the appropriate point.

APP ATTACK: Anti Valentine's Day

by Salehuddin Husin

Valentine's Day is a pain in the neck if you're single. Couples everywhere and the shameless pandering to them can make anybody about sick. Even app stores aren't safe as apps meant for couples flood them, with accompanying lists on what apps to use. We decided to do something opposite, apps for solo activities!



TIME TO SPLIT

iOS, Android



For the antisocial in all of us, Split is an app that lets you avoid people, or to be precise, people

you'd rather not see. You know, people like your exes, your enemies or worse of them all, your friends. It uses social media sites to keep track of people you'd rather avoid and then handily notifies you if you're near an unwanted encounter. It can even monitor designated areas for you and see if people you'd rather avoid are there or in the nearby area. Stay one step ahead and preserve your social ineptitude, get Time to Split.

COMIXOLOGY

iOS, Android, Kindle, Windows



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prepare for the next onslaught of superhero movies with this app. With comics from nearly every major publisher, your reading library's only limited by your funds! Even if you are limited by your disposable income, Comixology regularly has sales as well as free comics you can read. Sure, you won't have the pleasure of holding Amazing Fantasy #15 in your hands, but at least now you can read it anywhere without fear of devaluing it.

HEARTHSTONE

iOS, Android (Tablets only
Smartphone versions coming soon)



You won't need friends once Hearthstone's sunk its vicious claws into you. It doesn't matter

if CCGs make you fall asleep. Blizzard has streamlined the process and simplified it so that you can pick up and play in a matter of minutes. It even has different classes to level up, with the omnipresent lure of collecting cards. Since you can even carry your account between platforms (tablets, PC and soon, smartphones), you can always have ready access to your cards for random battling, perfect for the bored loner in all of us.

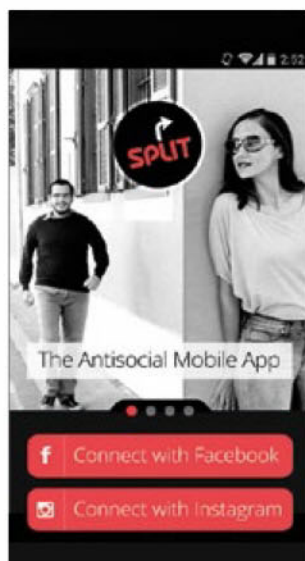
ANOMO

iOS, Android

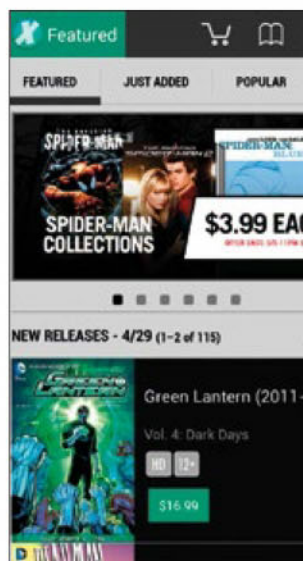


Even antisocial hermits will need to talk to somebody, sometimes. It's for times like

these that chat apps exist. There are quite a few of these anonymous apps, but we think Anomo is one of the better ones. It has regular updates (with the last one coming Dec 4th as of this writing) and it's free (although it does have in-app purchases). You can chat one-on-one or in a group, and even play games with other Anomo users, all without anybody knowing one another.



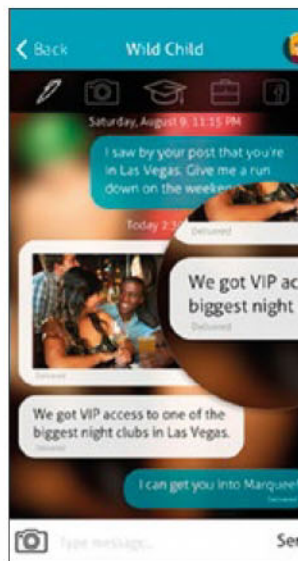
Find friends, enemies or annoying family members just so you know where to avoid them.



Marvel or DC? Why choose? Read them all.



If you've heard of World of Warcraft, you'll probably be familiar with the art style and characters.



Social networking for the antisocial. Now you can find fellow hermits near you too!

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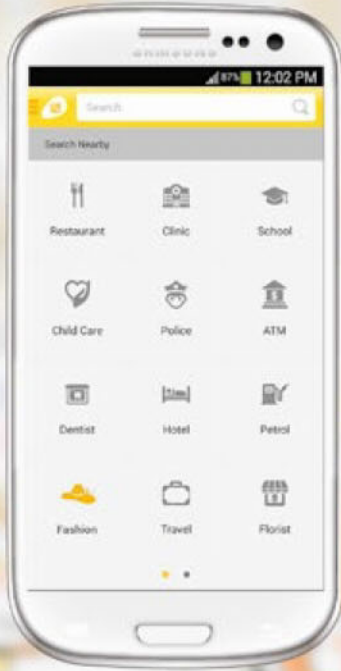
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The Raon Digital Everun UMPC, circa 2007, was a full, portable Windows XP Home computer before we ever thought tablets and touchscreens would take over the world one day.



PHOTOGRAPHY DARREN CHANG ART DIRECTION KEN KOH



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Let The **STDIRECTORY APP** Lead The Way

Tired of losing your way or frustrated at not being able to locate a computer repair shop you need close by? Whenever or wherever you are, whether you are searching for a computer course, audio visual equipment or the nearest IT retailer, use the STDIRECTORY mobile app to point you there.

Here are some of the exciting key features that users can look forward to.



Search nearby

Need to find a service or business close to you? Zoom in on the vendors nearest to you by clicking on the "Popular Categories" buttons. Otherwise, type in the service or business you are looking for into the search box and the results will show the nearest one to you.



Get directions

If you have found a service or business nearby, use this feature to guide you to your searched destination from your current location. The map will show you the approximate distance and time you will take to get to your destination.



Bookmark listings

Save a directory listing to view later or share it with your friends through social media or SMS service.



Refine your search

You have the option to sort your search results according to the shortest distance from your current location (proximity) or relevance.



Make contact with businesses

Need to find out information or make a reservation? With this feature, you can easily contact vendors via the call and email functions.



Comprehensive database of businesses

There are currently almost 60,000 business listings within Singapore that you can find on the STDIRECTORY app. Business listings will be constantly updated to reflect the ever-changing needs and wants of consumers.

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CMOS AF

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point
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1.

ROG G551

Go stealth with the ROG G551's matte-black brushed aluminium finish. The 15-inch G551 delivers smooth performance and superior visuals with an Intel® Core™ i7 processor and the latest gamer-grade NVIDIA GTX series graphics. A silent and powerful thermal solution ensures the system stays stable in the heat of any battle. A Full-HD IPS panel with 178-degree viewing angles provides eyes on the ground, while ASUS SonicMaster and ROG AudioWizard enhance sound from the front lines.

2.

ROG CG8890

Meet the titan of unfair advantages. This superpower stays cool under any pressure, thanks to 10 powerful crimson fans, hundreds of vents, and an integrated liquid-cooled CPU. Powered by an Intel® Core™ processor, the Tytan transforms into a beast with a one-click Turbo Gear mode that instantly accelerates its 6-core CPU to 4.2GHz. Maintain front-sight focus with the latest NVIDIA GeForce graphics card, which produces smooth gameplay with the power to play on up to four monitors, plus the option to go in NVIDIA 3D Vision Surround.

3.

ROG G30AK

The Tytan ROG G30 fights to win. Turbo Gear lets you overclock its Intel® Core™ i7 processor with a single click, unleashing 4-cores of CPU power to a maximum speed of 4.1GHz – all without the need to stop and reboot. The NVIDIA GeForce GTX graphics card plays at the highest settings and has the power to support up to four monitors, with the option to game in NVIDIA 3D Vision Surround. Intelligent thermal design and integrated liquid cooling help you persevere through the most scorching missions and secure the target.

4.

ROG G20

Deceptively powerful, the G20 has a 12.5-liter chassis engineered to be sleek and concealed. It houses an Intel® Core™ i7 processor and an NVIDIA GeForce GTX 970 graphics card to provide unstoppable firepower, with a hidden airflow channel and dual blowers that help the G20 vent heat. It's a silent professional, running at just 22dB when idle, and an ASUS-exclusive Aegis app provides you with an intuitive command centre to monitor your system. Customise up to 8 million colours along the chassis across three zones, and then take gaming to the next level by hooking the G20 to a 4K external monitor.





THE CHOICE OF
CHAMPIONS



ROG G751



ASUS ROG
EXPERIENCE POWER

THE ULTIMATE FIGHTING MACHINE

ROG G751

Windows 8.1 Operating System :: Desktop Level Performance with Intel® Quad-Core i7 Processor :: Gamer-Inspired Design :: Bundled with ROG Gamer's Pack[^] (worth \$397)

Work easy. Play hard.



Windows

*While stocks last. [^]Free Assassin's Creed Unity Game with every purchase of ROG G20.

ASUS recommends Windows.



ROG G20

G SERIES

POWER FROM WITHIN

MACHINE FOR ALL GAMERS

ROG G20*

Powerful 12.5 Litre	⋮	Cool, Quiet & Energy-Efficient	⋮	Customisable Lighting Effects	⋮	Hook Up to a 4K Display for
Small Form Factor Desktop	⋮	Blowers at 22dB during Idle	⋮	with 8 Million Colours	⋮	Enhanced Gaming Experience

THE CHOICE OF **CHAMPIONS**

